PIT & QUARRY

October, 1979

Maintenance

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ON THIS MONTH'S COVER

An artist's portrayal of the broad spectrum of plant equipment which is so dependent on good maintenance practices . . . the subject of special features in this issue.

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PIT & QUARRY

The basic magazine in a basic industry
PRICE Two dollars

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	1979 July (000)	1978 July (000)	% Change
Nonresidential Building	$ 4,509,697	$ 4,461,491	+ 1%
Residential Building	7,007,507	6,823,041	+ 3
Nonbuilding Construction	3,198,049	3,506,143	+ 9
Total Construction	$14,715,253	$14,790,675	− 1%

	1979 7 mos. (000)	1978 7 mos. (000)	% Change
Nonresidential Building	$29,241,556	$25,289,111	+ 16%
Residential Building	45,654,837	43,536,938	+ 5
Nonbuilding Construction	26,347,490	23,846,226	+ 10
Total Construction	$101,243,883	$92,672,275	+ 9%

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**Based on statistics compiled by the F. W. Dodge Div., McGraw-Hill Information Systems Co.*

ESCSI Safety Award Winners

Recognizing that plant safety is one of industry's most important concerns, the Expanded Shale Clay & Slate Institute is recognizing all those who worked in the expanded shale, clay and slate plants, in which no lost-time accident occurred.

Rules and regulations for the safety award program were written by a member company task force and are one safety award plaque given annually to the individual plant, regardless of production, with the highest number of man-hours without a lost-time accident; a certificate of achievement given to each plant that has gone through one year without a lost-time accident; and individual certificates given to employees of the winning plants.

The winner of the Expanded Shale Clay and Slate Institute's first safety award contest is the A. Floyd Old Plant, Solite Corp., Arvonia, Va. Certificates of achievement were awarded to the following plants: Arkansas Lightweight Aggregate Corp., England, Ark.; Domtar Construction Materials, Mississauga, Ont., Can.; Carolina Solite Corp., Aquadale, N.C.; Florida Solite Corp., Green Cove Springs, Fla.; and Utelite Corp., Coalville, Utah.

U.S. Gypsum to Modernize Philadelphia, Pa. Plant

United States Gypsum Co., Chicago, Ill., has approved modernization of its Philadelphia, Pa. plant. The plant's gypsum wallboard panel production process will be updated to provide a more efficient operation and expanded output. A new, more thermal-efficient calcination process will be installed, gypsum board-

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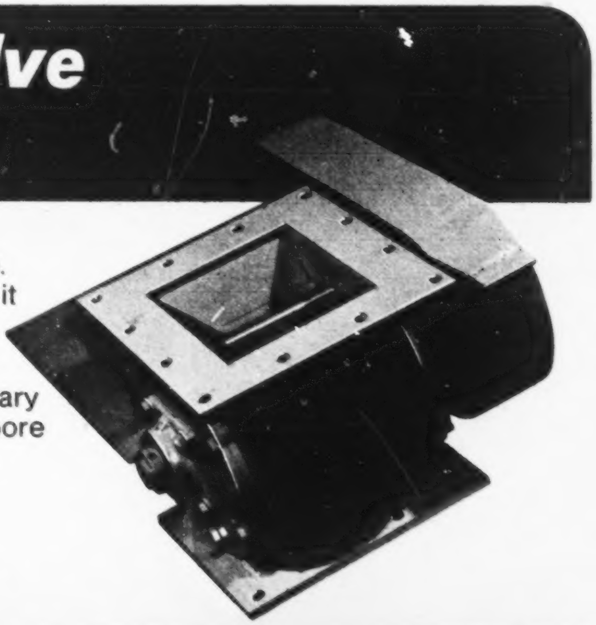

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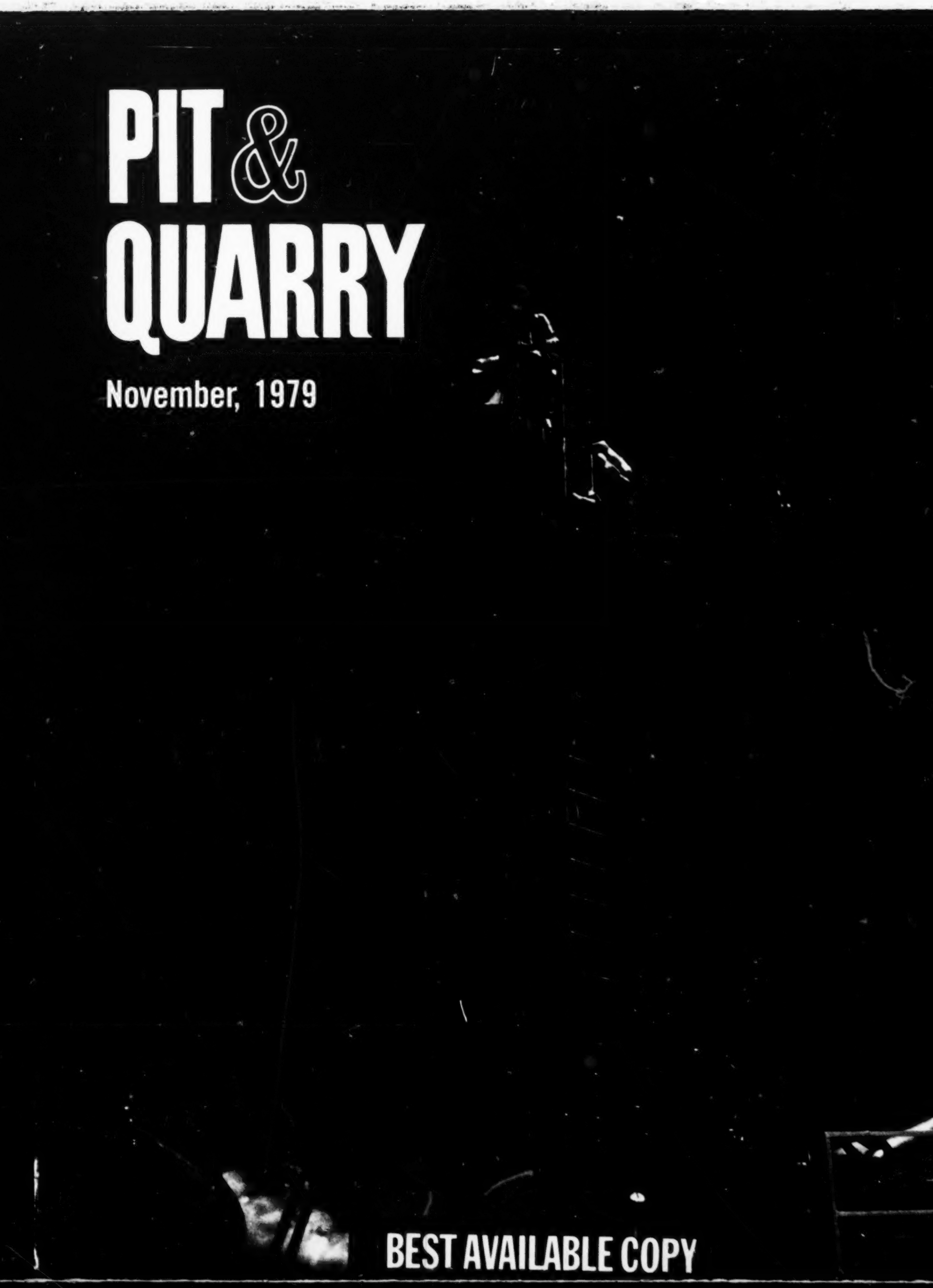

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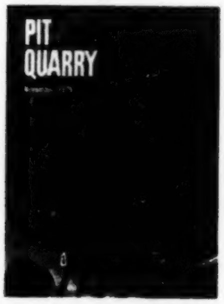

Adding to crushing knowledge in a unique way. See p. 48. Photo by Jack Gordon Creative Services.

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mation of the joint venture is subject to the execution and delivery of a definite agreement and to approval by the management and boards of directors of both companies.

With production start up tentatively projected for early 1982, the mine would yield an estimated three to four million tons of phosphate rock per year, when operating at full capacity.

PERSONNEL
DUANE

"You'll start work in Department 2B, Mr. Karns, just ask anyone where 'the hole' is."

COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1979 Aug. (000)	1978 Aug. (000)	% Change
Nonresidential Building	$ 4,514,840	$ 4,099,532	+ 10%
Residential Building	6,986,895	7,120,408	− 2
Nonbuilding Construction	2,888,803	4,802,404	− 40
Total Construction	$14,390,538	$16,022,344	− 10%

	1979 8 mos. (000)	1978 8 mos. (000)	% Change
Nonresidential Building	$33,608,487	$29,386,119	+ 14%
Residential Building	52,601,135	50,667,518	+ 4
Nonbuilding Construction	29,128,101	28,640,197	+ 2
Total Construction	$115,337,723	$108,693,834	+ 6%

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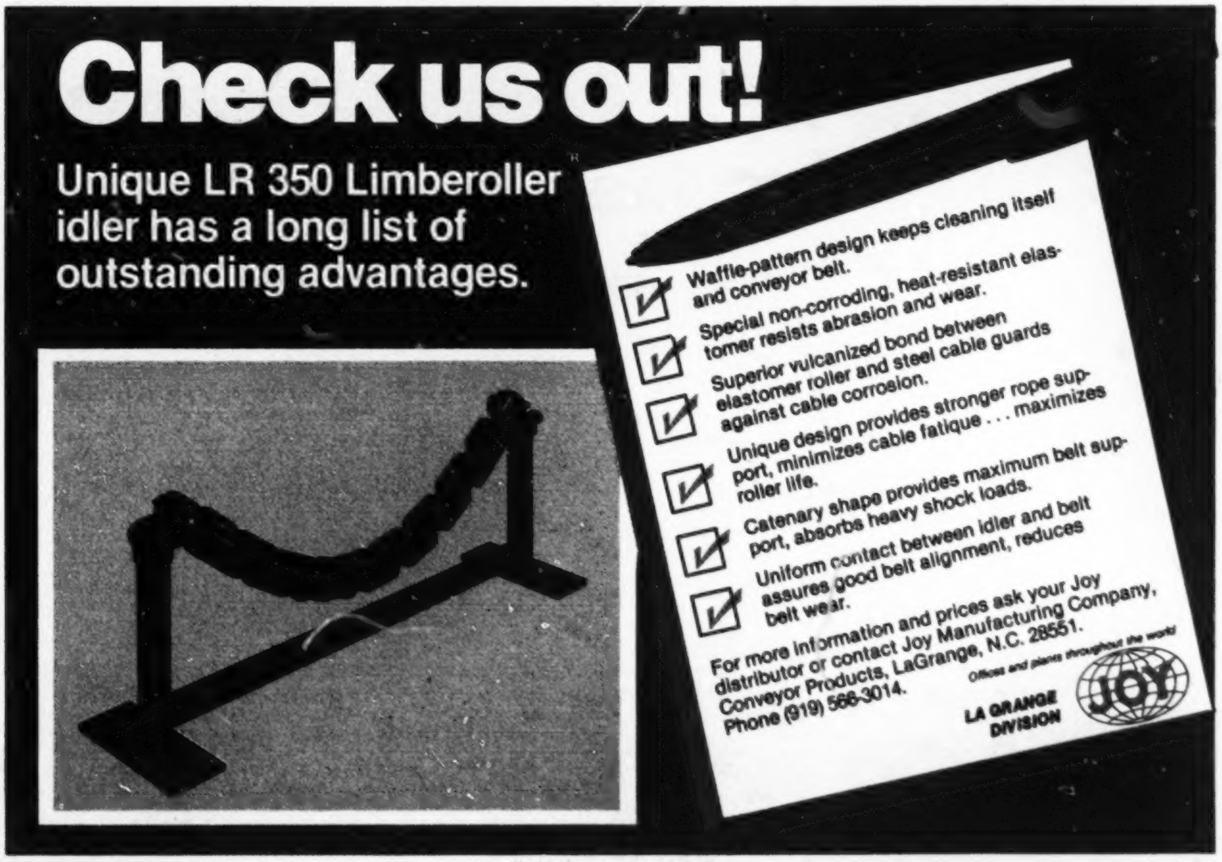
CIMA Publications Catalog Available

The Construction Industry Manufacturers Association has published a reference guide to safety publications and other materials on earthmoving, construction and mining machines. The new catalog describes the safety, training, technical and other informational materials available from CIMA.

The 12-page catalog contains a price listing on eight operator safety manuals, slide presentations, job-site safety posters, and other booklets. For a copy of the new catalog write CIMA, 111 East Wisconsin Ave., Milwaukee, Wis. 53202.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December, 1979

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PIT QUARRY
preview

Your badge is your key to seeing hundreds of products and services at the 1980 International Concrete & Aggregates Show. Note special preview in this issue.

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	1979 Sept.	1978 Sept.	% Change
Nonresidential Building	$ 4,471,198	$ 4,742,636	− 6%
Residential Building	6,248,212	6,496,063	− 4
Nonbuilding Construction	2,560,008	2,882,107	− 11
Total Construction	$13,279,418	$14,120,806	− 6%

	1979 9 mos.	1978 9 mos.	% Change
Nonresidential Building	$37,891,184	$34,115,617	+ 11%
Residential Building	58,832,251	57,168,918	+ 3
Nonbuilding Construction	31,616,646	31,518,280	—
Total Construction	$128,340,081	$122,802,815	+ 5%

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(1972 = 100, seasonally adjusted)

July, 1979	August, 1979	September, 1979
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Based on statistics compiled by the F. W. Dodge Div., McGraw-Hill Information Systems Co.

ment entered into in November 1974. In February 1977, the provisions and conditions were defined in greater detail with the signing of documents implementing the earlier agreement. Now, all conditions have been met for the partnership to be established.

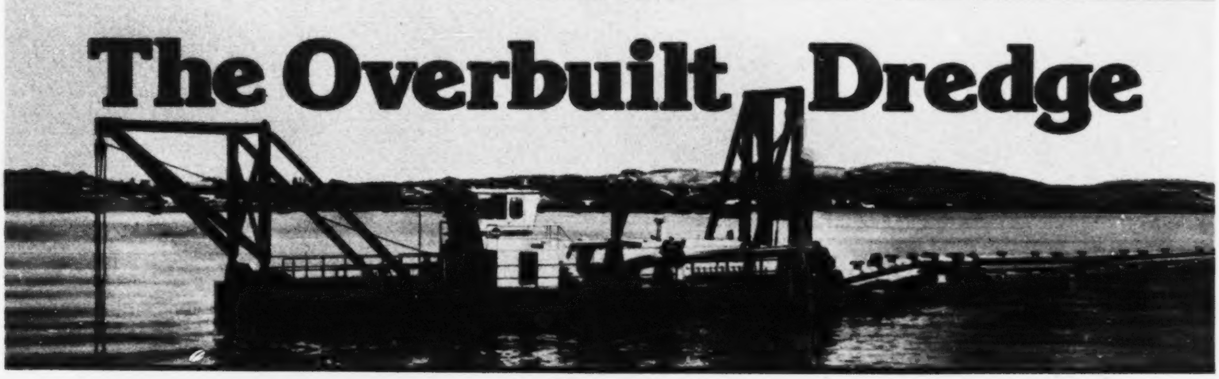
Papers Needed for Symposium On Aggregate Resources

A call for papers is issued for a Symposium on Extending Aggregate Resources scheduled for December 1980 in Orlando, Fl. The symposium is sponsored by Committee D-4 on Road and Paving Materials of the American Society for Testing and Materials (ASTM) through its Subcommittee DO4.92 on Papers and Symposia. The symposium will be held in conjunction with meetings of the committee.

The symposium sessions will provide a forum for the exchange of knowledge on ways, means, and benefits involved with conservation of aggregate resources, including attendent energy savings and improvement of the environment.

Papers are sought on a wide variety of subjects that will contribute to the general theme of the symposium. Papers may address beneficiation, specification, and utilization of what are generally considered industrial by-products or waste materials. Actual field performance evaluation information also is welcome.

Possible topics for inclusion are: marginal aggregate; slag aggregates; blended aggregates; synthetic aggregate; manufactured sands; waste material aggregates; and mineral fillers.



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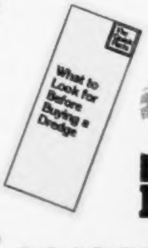
This free booklet gives simple answers to these and to many other questions. We call it *"What to Look for Before Buying a Dredge."* If you're interested in dredging, it's "must" reading. Call, or write for your FREE copy, today. Phone: (314) 638-4000. Telex: 44-2301.


What to Look for Before Buying a Dredge

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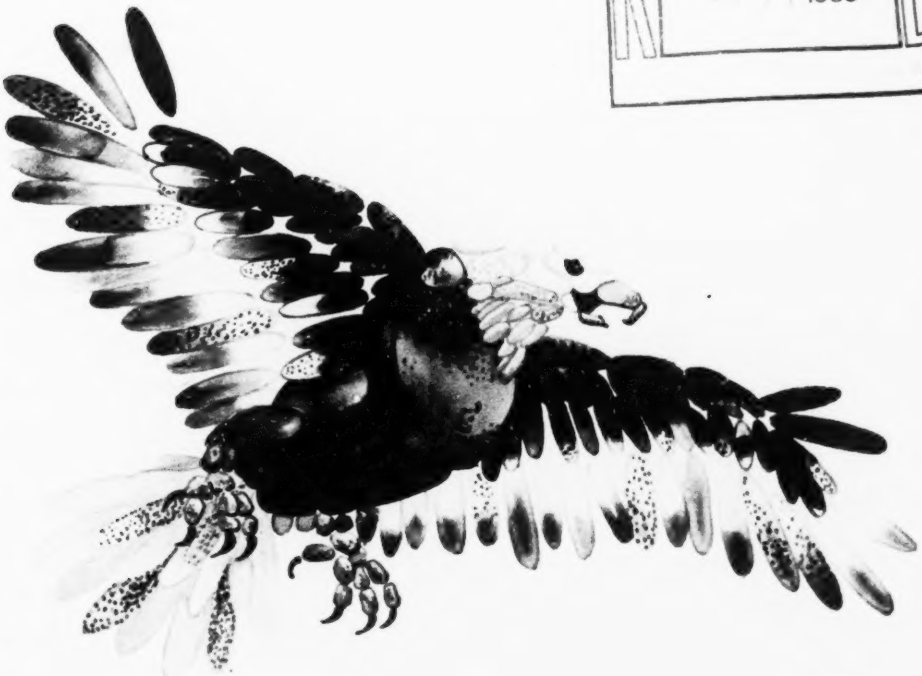

Taking off into the eighties . . .
Can industry weather the storm?

1979 REVIEW & 1980 OUTLOOK

ON THIS MONTH'S COVER

As the decade ends, we review 1979 industry performance and consider the outlook for the first year of the eighties. (Illus. by Janet Wilcox).

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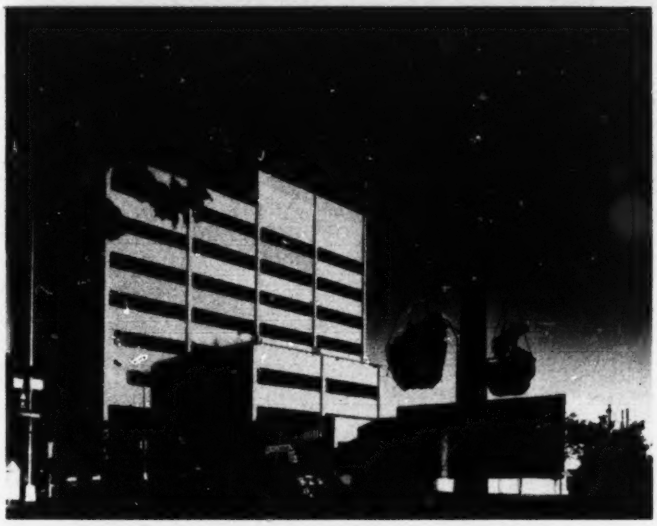
Construction



Inflation, high interest rates slowed progress in '79; expect parallel in '80

BY JIM KOSTKA

Although there was no glaring evidence that construction was on the decline late in 1979, there were some underlying signs that indicated that the four consecutive years of growth by this industry had come to an end. Construction's anticipated 1979 gain of 8% in dollar volume will not be enough to offset inflation which reached a rate of about 13%. This means that actual physical construction put-in-place slipped below the 1978 level.

In an effort to control inflation, the prime interest rate was raised a number of times during 1979 finally reaching a high of 15.5% in November. The purpose of this action, of course, was to make money more difficult to borrow. With money harder to obtain through loans, less was being spent, especially on projects requiring substantial amounts of capital such as construction. This action began to slow the pace of building activity early in the year and the slowdown continued for the remainder of 1979.

Along with the decline in construction in general came a drop in housing starts which had been up around the 2 million unit level in 1977 and 1978. By late in 1979, housing starts had declined to an annual rate of approximately 1.7 million units, indicating that the high interest rate money policy was producing the results for which it had been initiated.

In addition to the drop in the housing market, the $6 billion Local Public Works Act expired. This tended to further curtail publicly financed construction, leaving only commercial and industrial building to sustain the flow of new construction projects, but, with the economy moving toward a recession, support from the private nonresidential sector was rapidly waning.

Indications are that the Federal Reserve Board will continue to manipulate the prime interest rate until the rate reaches a point where it deters inflation and holds it in check. After that has been accomplished, the prime interest rate will be dropped gradually to stimulate the economy. It appears now that an annual inflation rate of 8% is the government's aim. This may be further supplemented by a reduction in the federal income tax in 1980.

Outlays for new construction in 1980, according to information provided by the U.S. Department of Commerce, Bureau of Census and Bureau of Domestic Business Development, are expected to amount to $223 billion—only $500 million above the 1979 total. Based on 1972 constant dollars, this represents a decline of 9% in actual physical volume of work put-in-place.

Private construction

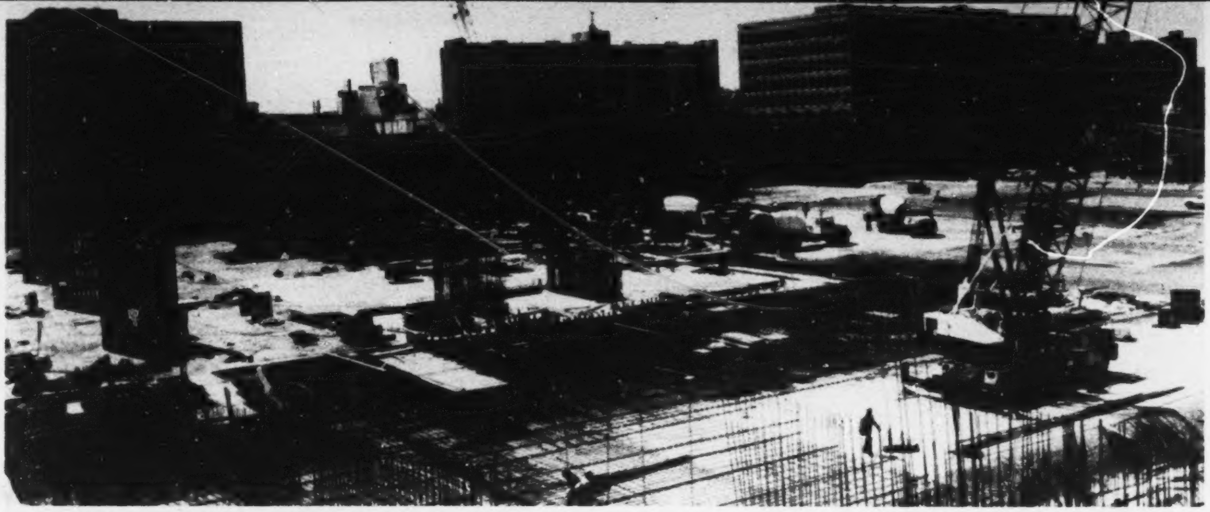
Most of the 1979 rise in construction spending was from privately owned construction rather than from the public sector. Private construction reached a total of $176.3 billion in 1979 for a gain of $15.9 billion over the previous year. Expectations for private construction in 1980 call for an $800 million decline which would bring this type of construction down to the $175.5 billion level. Much of this drop will be the result of the 13% decline in housing starts expected in 1980.

Public construction

The public sector, which accounted for about 20% of all construction outlays in 1979, reached $46.25 billion—a modest gain of 1% over 1978. A slightly better performance is expected from this sector in 1980 when the value of its construction is supposed to climb to $47.5 billion—a gain of almost 3%. There was a spurt in public construction in 1978 when federal government emergency public work funds were released.

In 1979, this sector moved laterally with some of the categories such as hospitals and water supply facilities, declining. Other categories—like housing and redevelopment, industrial, educational, highways and streets, military facilities, conservation and development—registered enough gain to keep the public construction sector in the black, but not by much.

The U.S. Department of Commerce projections on construction activity in 1980 are based on the assumption that the U.S. will have a recession of moderate depth and duration. It feels that real GNP (Gross National Product) will decline in the first half of 1980, then start to climb during



San Francisco's George R. Moscone Convention Center will require 120,000 cu. yd. of concrete. The general segment of public construction dropped to $4.45 billion in 1979, and is expected to decline further in 1980 and reach a total of $4.15 billions.

the second half of the year. It also assumes that interest rates for long term funds will peak early in 1980 and will not decrease significantly during the rest of the year. Many public works projects on the state and federal levels are likely to be deferred in 1980 due to the high cost of borrowing money. Furthermore, a conservative policy of federal aid to projects normally dependent upon such aid should reduce the possibility of a resurgence of public construction activity. Emergency public works legislation enacted in 1976 is not expected to offset the anticipated decline in private residential and nonresidential activity.

Even though the cost of construction loans and long-term permanent financing loans was higher than at any time since World War II, funds for underwriting the huge construction market of 1979 were generally available. Savings institution deposits were down from 1978 levels, but these institutions attracted investors in six month savings certificates with rates of return tied to the weekly market rate of six month Treasury bills. This helped satisfy residential mortgage market demands. Widespread withdrawal of funds from savings banks into higher yielding investments did not occur until late in the year when disparities developed between short- and long-term interest rates. The increasing volume of foreign investment capital, however, helped finance commercial and industrial construction during 1979.

Mortgage money was available during most of 1979. This helped moderate the decline of the housing market. But, late in 1979, there was a deterioration in the mortgage market when rates escalated and available money began to dry up.

The downturn in the housing market is expected to continue through the first half of 1980 due to more restrictive lending policies involving high down payments and peak interest rates. It appears that the 12-13% mortgage rate, which was common late in 1979, will begin to turn downward until the latter part of 1980.

Residential construction

During the first half of 1979, residential construction was stronger than anticipated. Second quarter housing starts were well over 1.8 million units on a seasonally adjusted annual basis, placing the rate about 10% below the 2 million starts in 1978.

Starts for the entire year of 1979 totaled 1.75 million units, reflecting a market influenced by construction costs that rose 13.8%, rapidly rising sales prices, and an increasing inability of potential buyers to afford houses being offered. Financing, generally, was relatively easy to obtain but at mortgage rates that continued to climb throughout the year. An adequate supply of lending money was on hand because of the high interest rates offered by various savings institutions, making saving money more attractive than borrowing it.

Indications are that housing starts in 1980 will drop to around 1.4 million units. This decline from 1979 will not be due to a lack of demand but because of recessionary influences. Basically, the demand for new housing is strong because of a high rate of household formation and the trend toward using home ownership as a hedge against inflation. A growing number of two-income families, as well as the rapid increase in the purchase of older homes, has helped keep new homes affordable and offset much of the impact of extremely high interest rates and steeply rising prices for these homes.

A low vacancy rate, less than 5%, also will aid the 1980 housing market. Conversely, growing pressures for rent control in many communities, which serve as a threat to potential investors in rental housing, have kept multi-unit construction at a low rate. Almost 600,000 multi-units were started in 1977 and 1978. During 1979, multi-units fell to about 550,000.

The 1980 distribution of new housing starts, about 950,000 units in single-unit structures, represents a decline of 20% from 1979; 450,000 in multi-unit structures reflects the continuing advantage of home ownership.

It is anticipated that the housing recession will bottom out in the first quarter of 1980. This will be followed by a slow but steady recovery. Mortgage rates will re-

Type of Construction	(In millions of current dollars)		Percent change 1978-79	1980[1]	Percent change 1979-80
	1978	1979[1]			
Total new construction	206,224	222,500	8	223,000	[2]
Private construction	160,403	176,250	10	175,500	[2]
Residential buildings	93,425	97,500	4	89,500	–8
New housing units	75,808	77,000	2	67,500	–12
Additions and alterations	16,350	18,500	13	20,000	8
Nonhousekeeping	1,267	2,000	58	2,000	0
Nonresidential buildings	36,293	45,450	25	49,900	10
Industrial	10,994	15,000	36	17,500	17
Office	6,574	8,900	35	9,600	8
Other commercial	11,991	14,400	20	15,000	4
Religious	1,248	1,450	16	1,550	7
Educational	729	850	17	950	12
Hospital and institutional	3,347	3,500	5	3,850	10
Miscellaneous	1,410	1,350	–4	1,450	7
Farm, nonresidential	5,253	5,700	9	6,250	10
Public utilities	24,148	26,300	9	28,450	8
Telephone	5,418	5,900	9	6,400	8
Electric light and power	14,915	15,750	6	16,350	4
Gas	2,244	2,800	25	3,400	21
Railroad	1,037	1,200	16	1,450	21
Petroleum pipelines	534	650	22	850	31
All other private	1,283	1,300	1	1,400	8
Public construction	45,621	46,250	1	47,500	3
Buildings	15,236	15,000	–2	15,400	3
Housing and redevelopment	1,053	1,200	14	1,300	8
Industrial	1,183	1,300	10	1,400	8
Educational	6,264	6,450	3	6,650	3
Hospital	1,822	1,600	–12	1,900	19
Other public	4,914	4,450	–9	4,150	–7
Highways and streets	10,709	11,000	3	11,000	0
Military facilities	1,498	1,650	10	1,850	12
Conservation and development	4,435	4,700	6	4,850	3
Other public construction	13,943	13,900	[2]	14,400	4
Sewer systems	6,765	6,750	[2]	6,800	1
Water supply facilities	2,661	2,150	–19	2,200	2
Miscellaneous	4,517	5,000	11	5,400	8

Source: Bureau of the Census and Bureau of Domestic Business Development (BDBD).
[1] Estimated by BDBD. [2] Less than one-half of 1 percent.

main high in 1980, staying around 12% early in the year. If inflation eases, mortgage rates could drop to about 11% late in the year.

Expenditures for new housing in 1977 amounted to $77 billion. Dollar outlays for this category in 1980 are expected to fall to $67.5 billion, a drop of 12%.

As has been the case in the past, 1979 housing expenditures on additions and alterations rose 13% to $18.5 billion. When the housing market becomes tight, people tend to make do with what they have by repairing and remodeling. A further increase of 8%, which would bring it up to $20 billion is looked for in this sort of construction in 1980.

Nonhousekeeping

This sector is made up of private nonresidential buildings, largely hotel and motel construction. In 1979, this type of construction jumped 58% over the previous year to a total of $2 billion. Uncertainties about future gasoline supplies and the rising cost of travel should curtail construction expenditure growth of this type in 1980 so that it will remain virtually the same as it was in 1979.

Private nonresidential buildings

Enjoying a gain of 25% and reaching a total of $45.45 billion in 1979, this sector was definitely the strongest in the entire construction market. Except for miscellaneous buildings, all types of nonresidential buildings showed gains in 1979 over 1978. Increases ranging anywhere from 5% for hospitals to 36% for industrial buildings were recorded.

Industrial construction, which amounted to $15 billion, represented nearly one-third of all construction in the nonresidential building category. Also providing substantial gains for this group were the office and other commercial (shopping centers and stores) segments with respective gains of 35 and 20%. Construction of educational facilities moved upward 17% and religious building rose 16%. Hospital and institutional construction followed with a 5% increase.

All segments of nonresidential building construction are counted on to show gains in 1980, but at a lesser rate than in 1979. The category as a whole will be up 10%, with these increases for the various segments: industrial, 17%; office, 8%; other commercial, 4%; religious, 7%; educational, 12%; hospital and institutional, 10%; and miscellaneous, 7%.

Farm construction

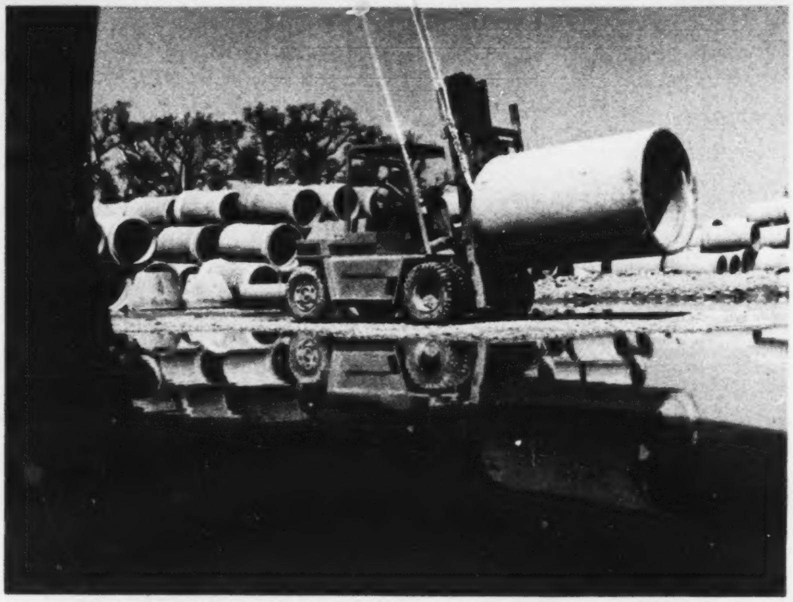
Over the past few years, there has been no significant change in the trend of spending for nonresidential farm construction. In 1979 this category accounted for \$5.7 billion in construction, up 9% from the year before. A slightly higher increase of 10% is anticipated in 1980 which would bring this category's total to \$6.25 billion.

Public utilities

Total new construction value put-in-place for the public utilities sector rose by 9% to \$26.3 billion in 1979. Adjusting for inflation the overall physical volume was about equal to that of 1978. The 1980 picture for this sector looks about the same with an anticipated 8% increase in dollar outlays and a stable physical volume after accounting for inflation. This should bring the total up to \$28.45 billion.

The telephone and electric light segments registered moderate growth rates of 9 and 6% in 1979. Gas, railroad and petroleum pipeline construction had substantially higher rates of increase with gains of 25, 16 and 22%, respectively. These three segments will continue to show increases in the 20-30% range in 1980 while the telephone and electric light segments will gain less than 10%.

A combination of a slowing economy and the downtrend in housing slowed telephone construction in 1979 and is expected to do the same in 1980. The electric light and power segment growth possibilities are being stifled because of an anti-nuclear power attitude by some of the people. Costs of plants of this type are rising rapidly too, making this source of energy less attractive.



There will not be much of a change in the value of new system construction in 1980, when it reaches \$6.8 billion. In 1979 this type of construction amounted to \$6.75 billion.

Public construction

All new construction of publicly owned facilities edged up only 1% in 1979 with a total value of \$46.25 billion. A slightly better performance is forecast for 1980 when public construction should climb to \$47.5 billion for a gain of 3%. The rather poor showing of this type of construction was due partly to the depletion of federal government emergency funds that were used for public construction in 1977 and 1978, and to a lesser degree in 1979.

Public buildings

Combined, the five public building construction segments declined about 2% in current dollars in 1979, although three of the segments showed some increases. Hospital construction dropped by 12%, and public office buildings showed a decline of 9%. The overall 3% rise forecast for the buildings sector in 1980 is based on the anticipated rebound of the hospital segment to a record level. This does not represent a continuing trend, but rather a temporary spillover from the weak private hospital market of recent years which, in turn, reflects a growing dependence on publicly owned facilities.

Educational buildings, which represent the largest public buildings segment, showed a 3% rise in 1979 and probably will have a similar increase in 1980. In real volume terms, this means about a 10% decline for two successive years.

Construction of other public buildings, which are mostly office buildings, was down 9% in 1979 and will be around 7% in the red in 1980. Limitations on employment at the federal, state and local government levels has been at least partly responsible for the reduction of this type of construction. Also contributing to the decline may be the drying up of budget surpluses which had been enjoyed by many local governments over the past few years.

Highways and streets

On a dollar basis, construction of highways and streets has moved laterally the past several years. In 1979, this category accounted for \$11 billion in construction, representing a gain of 3% over 1978. Construction in 1980 is predicted to stay at the same dollar level. With the long-term interstate highway near completion and with toll and tax losses in 1979 because of the shortage of gasoline during part of the year, local highway expenditures will tend to favor the repair and upgrading of existing roads rather than new road construction. Work on bridges also is expanding and helping to maintain overall outlays for the highway category.

Sewer systems

Construction of sewer systems didn't live up to expectations in 1979. This was disappointing in view of the backlog of projects that existed. The $6.75 billion in sewer construction in 1979 was practically the same as it was in 1978. A very minor rise of 1% appears to be in line for 1980, which will bring this segment up to $6.8 billion. Because of the developing recession, local governments converted whatever capital they had available to other types of construction.

Water supply facilities

This segment of construction made the poorest showing of any type of construction in 1979. Its value dropped 19%, pulling the total value down to $2.15 billion. A recovery of only 2% appears to be in store for 1980, bringing the year's total up to $2.2 billion. This is far below the $2.66 billion attained by this construction segment in 1978.

In addition to a lack of funds at the local government level, the drop in housing was a dominant factor in the poor showing of construction of water supply facilities. Existing facilities apparently were adequate to meet the current needs.

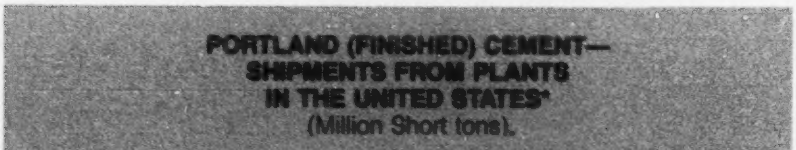
Miscellaneous

The miscellaneous segment of other public construction includes electric power and generation facilities, amusement and recreation facilities, and airport and mass transit facilities. This construction posted the best percent of gain of any public construction segments with an 11% increase. Its total for 1979 was $5 billion. The upward trend should continue in 1980 with an increase of 8% and a total of $5.4 billion. Its physical volume level, unlike most other construction segments, has been stable for three years and almost at the peak of 10 years ago. ●

Portland Cement

Production and project survey

BY SID LEVINE



The demand for portland cement in 1979 turned out to be greater than had been estimated earlier in the year. 1979 cement shipments from plants in the United States and Puerto Rico probably will amount to 84 million short tons. This total represents slightly more than that of 1978 and is the highest shipment figure since the record year of 1973.

In contrast to 1978, no shortage conditions have been reported in 1979. (Cement users in many areas of the country, primarily in the West and Midwest, reported delays or other difficulties in obtaining cement in 1978.)

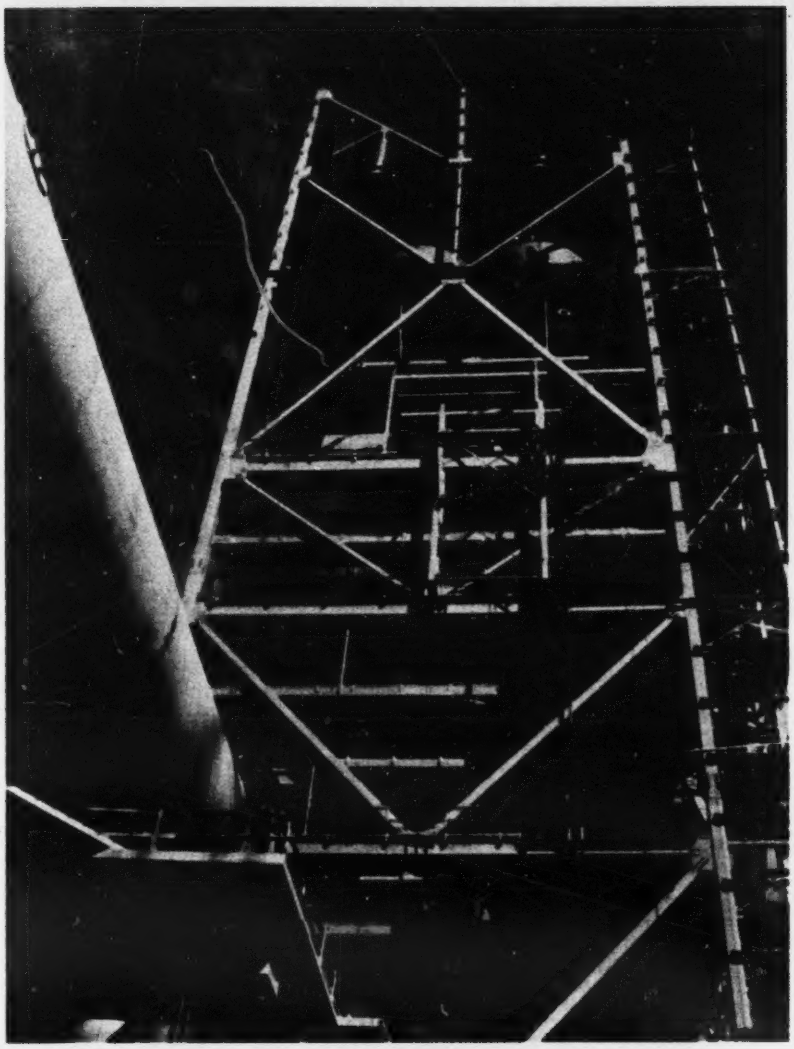
Estimated 1979 imports of cement and clinker are expected to total a record 11 million tons, 67% above the 1973 record and con-

1979 figures in this report represent estimates. This is due to the time lag between actual shipments and when figures are reported by agencies that track the cement industry.—*Ed.*

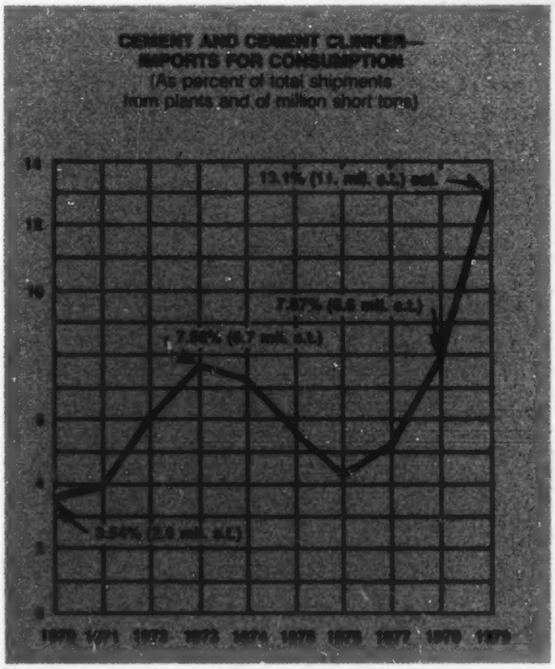
stituting about 13% of the year's portland cement shipments. As in 1978, exports may total less than 0.1%.

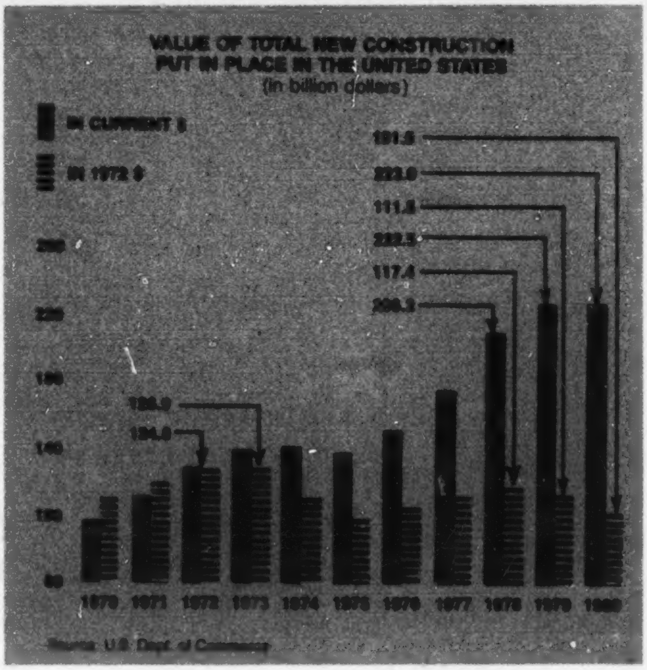
U.S. finished portland cement production is delineated by the Bureau of Mines in terms of shipments from mills (i.e., plants). (Mill shipments data comprehends cement ground from clinker manufactured in kilns in the United States and Puerto Rico, cement ground from imported clinker, and cement imported and distributed by domestic producers only.)

In 1978, cement manufacturing plants in the United States (including Puerto Rico) produced 75.5 million tons of clinker, and imported 3 million tons, to grind 81.4 million tons of portland cement. Domestic producers shipped 83.8 million tons of portland cement, which included 2.4 million tons of imported cement. Stocks decreased by 0.7 million tons. Additionally, 989,000 tons of portland cement were imported and shipped by others not producing cement. Puerto Rico shipments averaged 2% of total shipments in the five-year period 1974-78.



Reinforced suspension preheater system is scheduled for 1981 startup at Marquette Cement's 1.2 million tpy plant at Cape Girardeau, Mo. ***(Courtesy: Allis-Chalmers)***





Source: U.S. Dept. of Commerce

Based on late 1979 prices, the value of portland cement shipments for the year may exceed the $3.413 billion value of 1978 by 11% to 15%. The average value per ton for portland cement was $36.36 in 1977 and $40.71 in 1978. The estimated average price for 1979 may be about $46 per ton.

Shipments of masonry cement may show an 8% drop in 1979 from the 4.15 million tons shipped by producers in 1978. The average price per ton of masonry cement was $50.53 in 1978 and $45.03 in 1977.

Cement demand

The anticipated 1980 slowdown in construction probably will cut cement consumption by several percentage points. However, a carryover of construction work from 1979's building activity may ease the decline.

New construction spending for work put-in-place in 1980 is expected to be virtually the same as in 1979, according to a Department of Commerce prediction in the 1980 edition of its annual publication, "U.S. Industrial Outlook." This report includes one and five-year projections for major manufacturing and service industries. In 1979, actual construction outlays were estimated at $222.5 billion. Based on constant 1972 dollars, 1979 volume declined by about 5% from 1978.

Although at a record level, 1980 outlays would represent 9% less physical volume of work put-in-place (based on 1972 constant dollars) than in 1979. Compared to the peak physical volume of 1973, new construction activity will be about one-fifth lower in 1980.

The total value of contracts for new construction in 1980 was estimated at $169.5 billion in the "1980 Dodge/Sweet's Construction Outlook" (prepared October 1979). According to the report, this amount is a 2% gain over 1979's dollar amount, but an 8% decline in 1980 volume when adjusted for inflation. Various economic forecasts predict 1980 housing starts to range from 1.6 down to 1.2 million, compared with 1.7 million in 1979 and 2 million in 1978.

Capacity

At the end of 1978, 380 cement kilns at 157 plants were operated by 50 companies and one state agency in 39 states and Puerto Rico. Utilization of finish grinding capacity for portland cement production averaged 77.5%. No single company accounted for more than 7% of the nation's total clinker production. The 10 leading producers provided 48% of the total clinker production capacity.

In terms of clinker production, the top 10 in descending order were: Ideal Basic Industries, Inc., Lone Star Industries, Inc., General Portland, Inc., Martin Marietta Cement, Kaiser Cement & Gypsum, Marquette Co., a unit of Gulf & Western's Natural Resources Group, National Gypsum Co., Amcord, Inc., Medusa Cement Co., and Universal Atlas Cement Div. of U.S. Steel Corp. These companies also produced 47% of the finished cement ground in the United States in 1978.

Clinker grinding mills in 1978 were associated with 157 clinker producing plants, six of which produced white cement. Additionally, 12 plants operated grinding mills only on imported, purchased, or interplant transfers of clinker; four of these produced only masonry cement, one plant ground both portland and masonry cements, and one plant ground only calcium aluminate cement. Utilization of apparent annual clinker capacity average 84.7%.

Uses and markets

General use and moderate heat (Types I and II) portland cement constituted 91.64% of the 83.849 million short tons of cement shipped from plants in the United States (including Puerto Rico) in 1978. The next three highest groups were: high-early-strength (Type III), 3.36%; oil well cement, 2%; portland slag and portland pozzolan, 1.31%. Other cement types shipped were: sulfate-resisting (Type V), 0.28%; white cement, 0.47%; expansive cement, 0.10%; miscellaneous (including waterproof cement and low-heat Type IV), 0.84%.

Masonry cement—shipped by producers

	(million short tons)
1970	2.98
1971	3.39
1972	3.85
1973	4.13
1974	3.43
1975	2.91
1976	3.30
1977	3.76
1978	4.15

Fig. 4

Portland (Finished) Cement—Value of Shipments From Plants in the United States

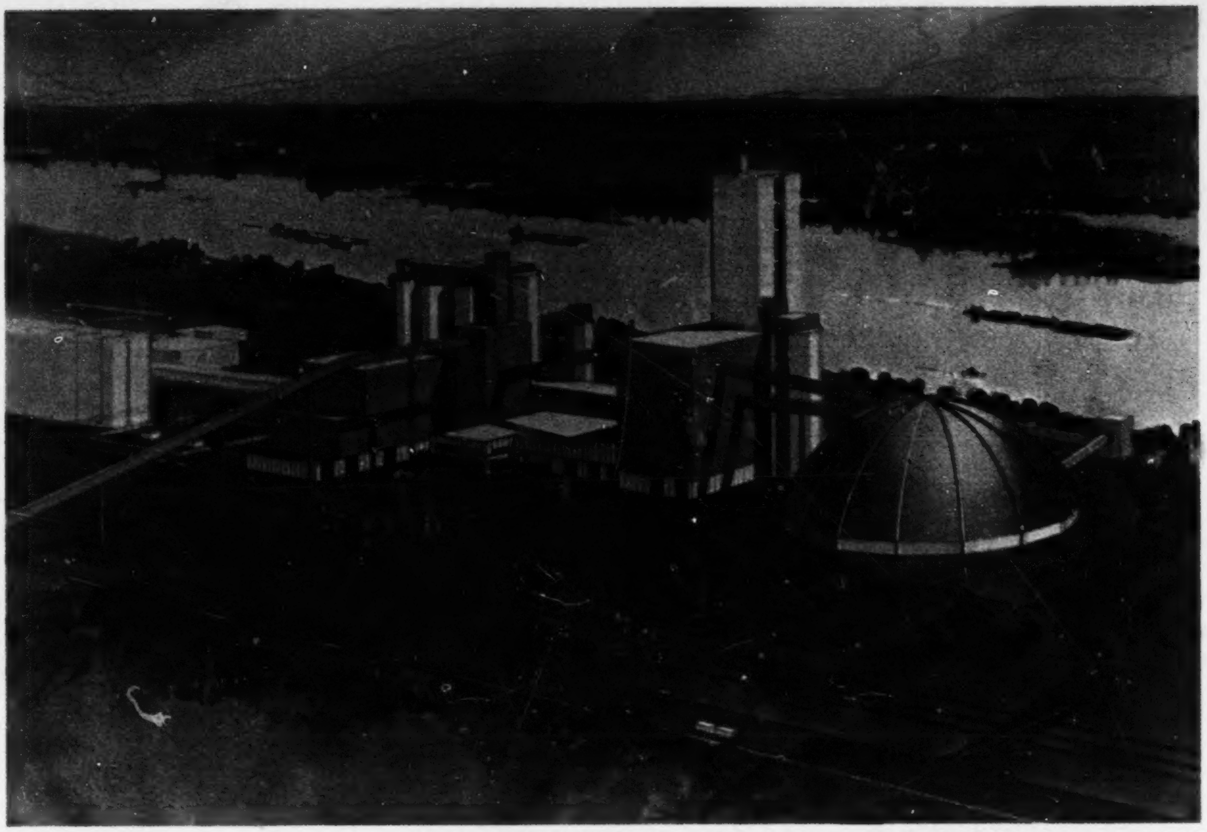
	Total value (billion dollars)	Average Value per short ton	
		In current dollars	In constant 1977 dollars
1970	$1.30	$17.69	$27.36
1971	1.48	18.74	27.58
1972	1.65	20.31	28.70
1973	1.90	21.86	29.23
1974	2.11	26.52	32.30
1975	2.11	31.09	34.55
1976	2.44	33.86	35.74
1977	2.83	36.36	36.36
1978	3.41	40.71	37.38
1979 (est.)	3.9	46.0	41.4

Fig. 5

U.S. Cement Consumption by PCA Region
(million short tons)

Region	1977	1978
Eastern	12.580	14.007
Great Lakes-Midwestern	14.086	14.771
Southeastern	12.161	13.682
North Central	5.228	5.364
Rocky Mountain-Northwest	6.363	6.848
Pacific Southwest	10.720	11.363
South Central	15.952	17.215
Total	77.090	83.250

Fig. 6



Martin Marietta's 850,000 tpy coal-fired dry process plant in Buffalo, Iowa is scheduled for completion in 1981.

Ready-mixed concrete producers accounted for 67% of portland cement shipments by domestic producers in 1978. Concrete products manufacturers used 13.8% to make concrete block, pipe, precast, prestressed, and other concrete products. Building material dealers received 7.9% of the total portland cement shipments. Highway contractors used 4.9%, and other contractors used 4.5% of the total. The remaining 1.9% was consumed by various government agencies and for various miscellaneous uses.

Forty-four percent of the 1978 portland cement production came from six states: California, Texas, Pennsylvania, Michigan, Missouri and New York. U.S. cement consumption in 1977 and 1978, by Portland Cement Association regions, are given in Fig. 6.

Corporate changes

Acquisitions by foreign interests and mergers by U.S. conglomerates continue to change the corporate face of the United States cement industry. This trend of the past several years is shown in Figs. 7 and 8. Estimates of U.S. cement capacity held by foreign interests range between 10 and 14%.

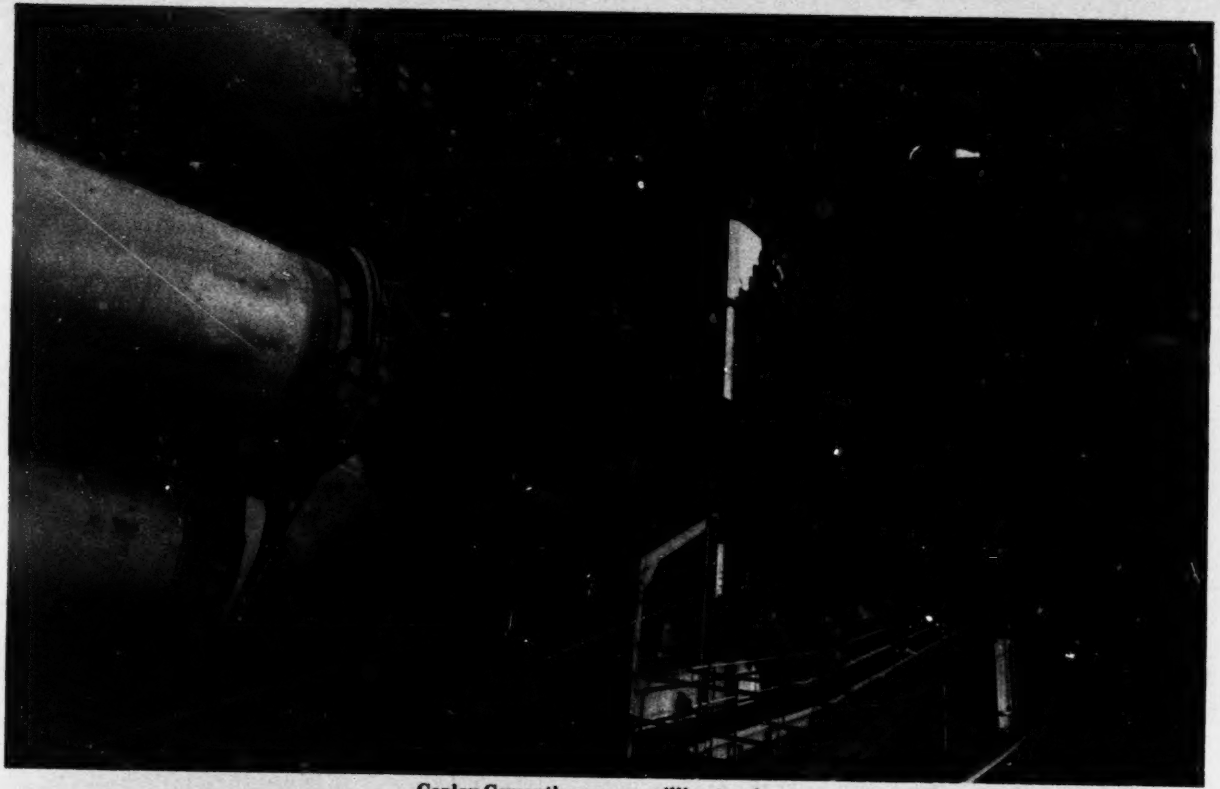
San Antonio Portland Cement Co., with a 470,000-tpy wet process plant in San Antonio, Tex., was purchased last year as a joint venture by Presa S.P.A. Cementeria di Robilante of Italy and Cementwerke Vigier A.G. of Switzerland. IFI International S.A., a European holding company based in Turin, Italy, purchased Missouri Pacific Corp.'s subsidiary River Cement Co. in 1979. River Cement's dry-process plant, located in Festus, Mo. (about 35 miles south of St. Louis, Mo.), is rated at 1.2 million tpy and went on stream in 1965.

Florida Mining & Materials Corp. was acquired last year by Moore McCormack Resources Inc., a Stamford, Conn. steamship and mine management corporation, after a bidding contest with Kaiser Cement Corp. Florida Mining's activities include production of cement, aggregates, ready-mixed concrete, concrete block, and precast/prestressed concrete. The cement plant, located in Brooksville, Fla. is a dry-process operation rated at 560,000 tpy.

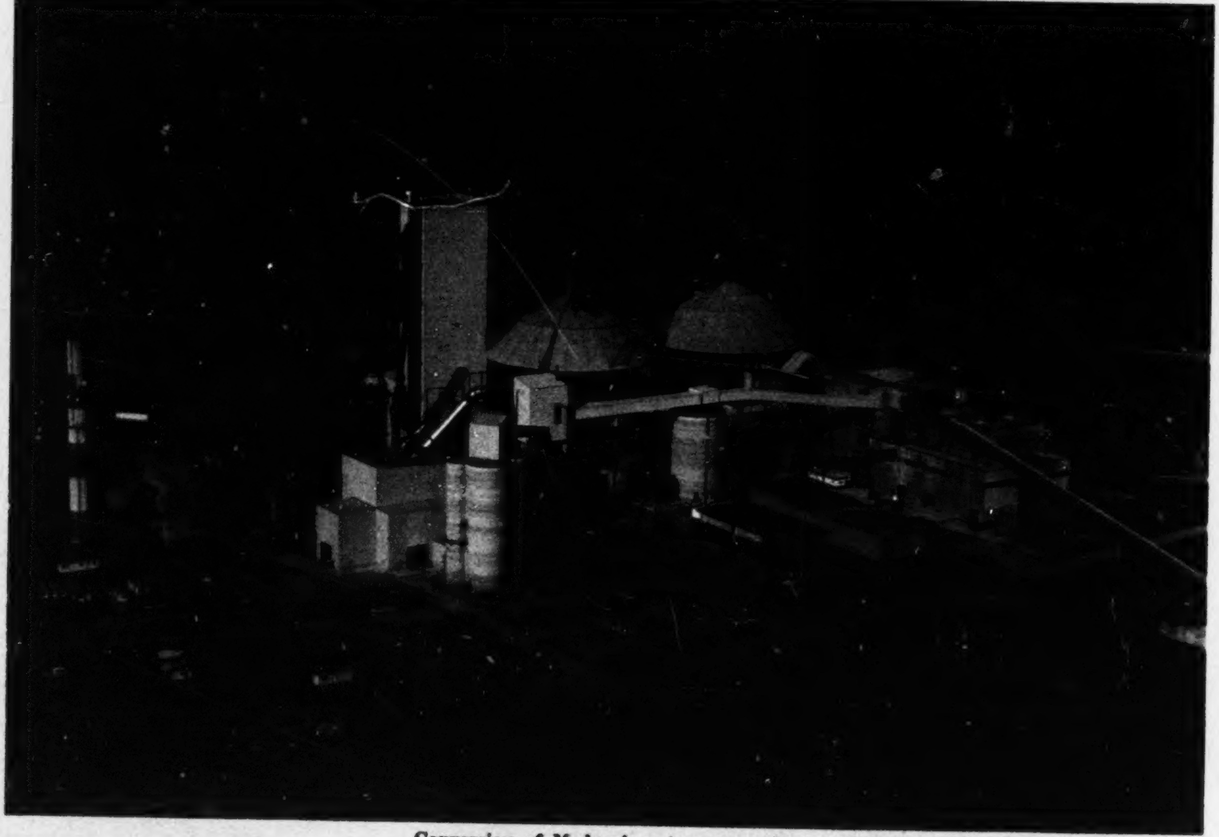
Lone Star Industries, Inc. acquired all of the stock of the Portland Cement Co. of Utah last year. Portland Cement Co. of Utah is headquartered in Salt Lake City. The wet-process plant, currently rated at 260,000 tpy, will be producing 400,000 tpy via an expansion program to be completed shortly.

Gifford-Hill & Co., Inc. and Amcord, Inc. have entered into a merger agreement in which Amcord will become a wholly owned subsidiary of Gifford-Hill. Amcord, rated as the nation's sixth largest producer of cement, operates five cement plants in California, Arizona, Michigan, and Pennsylvania. Gifford-Hill operates one cement plant in Texas and one in South Carolina.

The Flintkote Co. has been the target for acquisition by several groups. In October, Flintkote and



Coplay Cement's new one million tpy dry process plant at Nazareth, Pa. went onstream in 1978 *(Courtesy: Kaiser Engineers)*



Conversion of Medusa's wet process plant at Charlevoix, Mich. to the dry process, scheduled for 1980 operation, will increase capacity from existing 2400 tpd to 4400 tpd *(Courtesy: Kaiser Engineers)* have entered into an agreement for the acquisition of Flintkote by Genstar. Upon successful completion of the tender offer, Genstar intends to operate Flintkote as a separate susidiary under its present management. At the time of writing, an acquisition proposal for Flintkote by Louisiana-Pacific Corp. was still under consideration by Flintkote's Board of Directors.

New and planned projects

Start-ups, modernizations, and expansions of cement plants in 1978 and 1979, and projected installations are listed in this annual Pit & Quarry survey. About 9 million short tons of added capacity of clinker and cement are slated for the 1979-1981 period, with an additional 5 million tons on the books. Some older plants probably will close, thereby reducing net increases in cement capacity.

A Department of Commerce forecast issued last year ("1979 U.S. Industrial Outlook") predicted that portland cement output probably would rise at a compound average rate of 2.8% in the five-year period 1978-83. The cost of building a new energy-efficient plant meeting environmental standards now is about $100 per ton of annual capacity or about $50 to $100 million for average-sixed new plants.

Cement plant data

Alamo Cement Co. (subsidiary San Antonio Portland Cement Co.)

- Bexar County, Texas: New clinker producing plant is scheduled for operation late in 1981. Major equipment and process engineering will be provided by Polysius Corp. Equipment will include: Polysius roller mill for raw grinding; Polysius rotary kiln with Prepol preheater and alkali bypass; Claudius-Peters grate cooler; Polysius roller mill for coke and coal grinding; heat exchanger for recirculating vent air back to undergrate. Combined capacity from existing San Antonio plant and new Alamo Cement plant will be one million tpy.

Amcord, Inc.

- Oro Grande, Calif. (Riverside Cement Co. Div.): Addition of waste heat recovery systems to two of the plant's cement kilns, scheduled for 1979 completion, is expected to permit generation of 85% of the plant's electrical needs through utilization of the waste heat. The $10.5 million modernization program also includes installation of new environmental control equipment.

Ash Grove Cement Co.

- Louisville, Neb.: In mid 1979, Ash Grove Cement Co. engaged Bendy Engineering Co. to provide preliminary engineering for the next phase of a modernization program at the Louisville, Neb. plant. Major equipment in this program, if approved, will include a four-stage preheater kiln with flash calciner.

California Portland Cement Co.

- Mojave, Calif.: Addition of a one-million-tpy plant to the existing 1.1-tpy cement plant is scheduled for completion in early 1981. The Kaiser Engineers, Inc. division of Raymond International, Inc. has the contract to supply engineering, procurement, and construction management services for the estimated $100 million modernization and expansion program. Equipment will include: Fuller IHI precalciner; four-stage suspension preheater with flash furnace and 13 ft. 6 in. × 225 ft. rotary kiln section; Fuller grate clinker cooler; Allis Chalmers, 250 tph, 2,000 hp roller mill for raw grinding; Humboldt Wedag 1500 tph impact crusher; Leeds & Northrup dual computer. Coal will be supplied for the plant by the company's Soldier Creek Coal division near Price, Utah.

Coplay Cement Manufacturing Co.

- Nazareth, Pa.: A new one-million-tpy, $50 million dry process plant on stream in 1978 replaced facilities of half that capacity at Nazareth, Coplay, and Egypt, Pa. Equipment supplied includes: Polysius Dopol size 422 cyclone-type preheater/rotary kiln with planetary cooler; Allis-Chalmers type MPS 3750, 240-tph raw roller mill; F. L. Smidth, 6350-hp finish mill; C-E Raymond

The trend to coal burning for kiln firing continues. Many companies have either taken options, entered long-term leases, or acquired coal properties. Here's what Amcord, Inc.* has been doing about coal use.

"Amcord's growing participation in energy-related industries is represented by the company's operation of two coal mining companies and its newest subsidiary, Knight Industries, Inc. The company's early conversion of its cement kilns to coal firing has been rewarded with substantial savings in the cost of fuel. In addition, the company's acquisitions of additional coal properties have assured the cement operations of a reliable fuel supply and have removed the potential threat to Amcord of petroleum price increases or shortages. The California and Arizona plants are now capable of utilizing either coal, natural gas or fuel oil, enabling them to burn the most economical fuel available.

"Amcord's two coal operations are currently undergoing major expansions, with the two-year, $12 million project nearing completion. When completed in 1979, the expansion program will more than double annual coal production capacity to more than 1 million tons.

"The increasing importance of coal in today's environment can be illustrated by the rapid increase in coal usage by the cement industry. In 1972 less than 32% of the nation's cement plants utilized coal as the primary fuel; however, at the end of 1978 this figure had jumped to almost 70%. As the market for coal expands, Amcord is assured not only of a dependable source of coal for its own needs, but also a ready supply for sale to other industrial consumers.

"The long range prospects for our coal production facilities were further strengthened this past year through acquisition of additional coal properties adjacent to the Pennsylvania operations."

Source: 1978 Annual Report, Amcord, Inc.

coal-grinding bowl-mill system; Fuller Air-Merge blending system; Humboldt-Wedag air separator; American Air Filter electrostatic precipitator; Leeds & Northrup computer control system. Kaiser Engineers provided engineering, procurement, and construction management services.

Flintkote Co., The

- Redding, Calif. (Calaveras Cement Div.): A $40 million expansion and modernization program, scheduled for 1981 completion, will increase capacity from 290,000 to 600,000 tpy. Equipment includes: F. L. Smidth precalciner/preheater system with 4.35×66m rotary kiln section and planetary cooler; 150-tpd raw roller mill; Foxboro control units. Engineering is being handled by Kaiser Engineers.

General Portland, Inc.

- New Braunfels, Tex. (Balcones plant): A new 925,000-tpy, $80 million dry process preheater plant using coal as fuel is due on stream in late 1980. Equipment supplied includes: Polysius preheater-rotary kiln unit; C-E Raymond coal mill; Mikropul dust collectors; Fuller grate clinker cooler. Polysius Corp. is doing the engineering and supplying major equipment. The West German firm of Dyckerhoff Zementwerke A.G. is acting as consultant on design and start-up.

Ideal Basic Industries, Inc. (Cement Div.)

- Theodore, Ala. (near Mobile): New 1.5-million-tpy dry process (precalciner) plant is scheduled to be on stream in 1981. Estimated cost in 1977 dollars is $17.5 million. A quarry planned in Monroe County, Ala., will supply limestone. Equipment will include: Allis-Chalmers 4660 tpd reinforced suspension preheater system, consisting of a 260 ft. high suspension preheater tower, 16 ft.×280 ft. rotary kiln, and stoker-type clinker cooler; Stamler feeder-breaker in quarry; two Raymond coal mills; 65 Micropulsaire dust collectors; two 15 ft.×48 ft. 3½ in. F. L. Smidth Unidan finish mills with 6500-hp motors; four F. L. Smidth cement coolers. This plant eventually will replace the present Mobile plant. Brown & Root designed and is building the plant.
- Knoxville, Tenn.: Preheater-precalciner kiln was installed in 1979, replacing four kilns shut down in February, in order to convert the raw material system from wet to dry process. Capacity increased from 470,000 to 580,000 tpy. Equipment installed includes: Fuller suspension preheater with flash calciner and 12 ft.×165 ft. rotary section; Fuller grate clinker cooler; Mikropul dust collectors; Stamler feeder-breaker in quarry.
- Boettcher, Colo.: New grate preheater kiln will replace two 50-year-old kilns, to increase capacity from 325,000 to 460,000 tpy. Scheduled for 1981 completion, the project will cost about $34 million. The preheater is especially designed to utilize the kerogen in the kerogen-bearing limestone available in the quarry deposit. According to calculations, the kerogen will provide about one fourth of the fuel needed. Allis-Chalmers is providing the ACL system, including: 12 ft. 2 in. wide×112 ft. 6 in. long traveling grate; 14 ft.×15 ft.×204 ft. rotary kiln; 1400 tpd roller mill; type MPS 3450, 110 tph roller mill; stoker cooler; 15 ft. diam. pelletizer pan.
- Devil's Slide, Utah: A new one-million-tpy plant is being planned to replace the present 360,000-tpy plant.
- Tijeras, N.M.: Coal-burning facilities were installed in 1978. A project was authorized to add a two-stage preheater system to the existing dry process kilns to reduce fuel consumption. The estimated cost of the project is about $4 million, with completion in late 1979.
- Houston, Tex.: Coal-burning facilities were installed in 1978.

Kaiser Cement Corp.

- Permanente, Calif.: In a $78.5 million modernization program, a single preheater-precalciner equipped, dry process kiln will replace the present six oil-fired wet process kilns. The dry process kiln will burn coal as well as other fuels. Rated capacity will remain the same, at 1.6 million tons annually. Lafarge Consultants Ltd. of Montreal (Canada) was awarded the contract covering engineering design services, procurement assistance, and start-up responsibility. The rebuilt plant is scheduled to begin operating in mid-1980. The designed plant capacity is 1.6 million tpy. The equipment includes: an Allis-Chalmers 5,000 tpd reinforced suspension preheater with a 16 ft.×250 ft. rotary kiln section; two Raymond coal mills; two 15 ft.×53½ ft. Humboldt-Wedag center-

Will the cement shortage of 1978 be repeated? Can the United States meet its increasing need for this essential construction material? In its 1978 annual report, Lone Star Industries, Inc. suggests approaches for avoiding future crises in cement supply.

"Lone Star believes that the government and the cement industry can and must work together to ensure that cement supplies are available to satisfy the nation's ever-expanding needs.

"What, then, can be done to avoid a worsening crisis in cement supply?

"The cement industry, for its part, must continue to develop technology for greater fuel efficiency and accumulate capital for expansion.

"In the national interest, the government, for its part, should help in the following areas:

"Prices—By allowing a free play of market forces so that prices—in response to demand—can rise to levels where investments in new plants and technology will yield an acceptable return.

"Depreciation & depletion—By permitting depreciation allowances on a replacement-cost basis and retaining percentage depletion allowances.

"Tax credit—By increasing the investment tax credit as a spur to investment in new and efficient plant capacity.

"Double taxation—By eliminating double taxation of profits by modifying the tax on stockholders' dividends or further reducing the tax on corporate profits.

discharge raw mills, each equipped with a 5,000-hp single-pinion gear drive (preheater waste gases will be used for drying the mills).

- San Antonio, Tex. (Longhorn plant): A second preheater-precalciner tower will serve a dry process kiln installed during a partial modernization and expansion in 1975. The $14.5 million project will double the capacity of the kiln to 5,000 tpd. Equipment includes: Humboldt-Wedag Pyroclon suspension preheater system with precalciner; new coal grinding system; additional clinker cooling; new raw meal silo.
- Lucerne Valley, Calif.: Plans for a major modernization and expansion program for this 1.015-million-tpy wet plant have been announced.

Lehigh Portland Cement Co.

- Mason City, Iowa: Completed $25-million modernization and expansion program in 1978. New equipment includes: F. L. Smidth 500,000-tpy, four-stage suspension preheater kiln system with 13 ft. × 184 ft. rotary section, using a precalciner and a variable bypass; two C-E Raymond coal mills; Fuller clinker cooler; F. L. Smidth 15 ft. × 27 ft. 4 in. Tirax-Unidan raw mill with a 12 ft. × 9 ft. 6 in. overhung compartment for drying in the mill; a 20 ft.

"Capital gains taxes—By further reducing these to promote higher productivity and growth. Heavy capital taxes have diverted investment from basic national needs, causing U.S. industry in general to fall behind industry in other countries.

"Consolidation—By interpreting anti-trust laws to recognize the highly fragmented nature of the cement industry and the need for appropriate mergers or consolidations. This would permit operational efficiencies and the formation of capital necessary for investment in new capacity.

"Environmental regulation—By streamlining and speeding the process of environmental regulation and by permitting faster recovery of these expenditures, thus balancing environmental and economic benefits in the public interest."

Recent Foreign Acquisitions of U.S. Cement Companies

Parent company—Holderbank Financiere Glarus AG (Switzerland); Canadian subsidiary—St. Lawrence Co. (Montreal); U.S. subsidiary of St. Lawrence—Independent Cement Corp. (Keene, N.H.), established in 1977

Independent Cement acquisitions
- Hudson, N.Y.—purchased closed plant of U.S. Steel Corp.'s Universal Atlas Cement Div. in 1977
- Kingston, N.Y.—lease/purchase agreement for Colonial Sand & Stone Inc.'s plant in 1978

U.S. subsidiary of Holderbank: Dundee Cement Co. (Dundee, Mich.)
- Dundee, Mich.—onstream in 1960
- Clarksville, Mo.—onstream in 1967
- Holly Hill, S.C.—purchased Santee Portland Cement Corp. in 1978

Parent company—St. Marys Cement Co. (Toronto, Canada)
- Wyandotte, Mich.—acquired Wyandotte Cement Inc. in 1978

Parent company—Lake Ontario Cement Co. (Toronto, Canada); U.S. subsidiary—Aetna Cement Corp. (Essexville, Mich.)
- Essexville, Mich.—purchased Martin Marietta Corp.'s cement plant in 1977

Parent company—Portland-Zementwerke Heidelberg, A.G. (W. Germany); U.S. subsidiary—Lehigh Portland Cement Co. (headquartered in Allentown, Pa.), acquired in 1977

Parent company—Canada Cement Lafarge Ltd. (Canada); U.S. subsidiary—Citadel Cement Corp. Since 1974, Citadel had been a joint venture of Canada Cement Lafarge and Lone Star Industries, Inc. The joint venture was terminated in 1977

Plants operating under Citadel Cement:
- Demopolis, Ala.—new plant completed in 1977
- Birmingham, Ala.—existing plant

Parent company—Societe des Ciments Francais (France)
- Nazareth, Pa.—acquired Coplay Cement Manufacturing Co. in 1976

Parent company—Societe des Ciments Vicat (France)
- Ragland, Ala.—acquired National Cement Co., Inc. in 1974

Parent company—Genstar Limited (Montreal, Canada)
- The Flintkote Co.—acquired in 1979 (Flintkote's operations include four cement plants).

Fig. 7

Recent Mergers and Acquisitions: Domestic Companies

Amcord, Inc.—became wholly owned subsidiary of Gifford-Hill & Co., Inc., 1979. (Amcord: five cement plants; Gifford-Hill: two cement plants.)

Florida Mining & Materials Corp. (one cement plant)—acquired by Moore McCormack Resources Inc., 1979.

Marquette Cement Co.—acquired by Gulf & Western Industries, Inc., 1976.

Maule Industries, Inc.—acquired by Lone Star Industries, Inc., in 1978.

Medusa Corp.—acquired by Crane Co., 1978.

Portland Cement of Utah—acquired by Lone Star Industries, 1979.

SME Cement, Inc.—wholly owned subsidiary of Standard Machine & Equipment Co., Uniontown, Pa. Purchased former Diamond Portland Cement Co. plant in Middle Branch, Ohio, from Flintkote in 1978. Plant put into operation again in 1979.

Fig. 8

diameter Sturtevant separator; Fuller-Airmerge homogenizing system; electrostatic precipitator. Feasibility work was done by Lehigh and Bendy Engineering Co. Macdonald Engineering performed the design-engineering function and was the general contractor. A new Hammermills, Inc. Impact Master crusher was installed in the quarry.

- Alsen, N.Y.: Planning new 750,000-tpy plant.
- Union Bridge, Md.: Planning 500,000-tpy expansion.

Lone Star Industries, Inc. (Cement & Construction Materials Group)

- Santa Cruz, Calif.: Expansion and modernization, scheduled for late 1980 completion, will increase capacity from 395,000 tpy to 750,000 tpy. Equipment supplied includes: F. L. Smidth four-stage preheater-precalciner unit with 13 ft. × 184 ft. rotary kiln section; Folax grate clinker cooler; raw roller mill; homogenizing/kiln feed silos; new cement grinding mill; additional electrostatic precipitators; C-E Raymond bowl mill; 18 ft. diameter air separator. Engineering planning was carried out by Bendy Engineering Co. and SPCM, Inc.
- Georgetown, Tex.: New one-million tpy plant to be constructed on property owned by Texas Crushed Stone, Inc. No completion date given.
- Grantsville, Utah: Planning new 500,000-tpy plant.

Lone Star Lafarge Co.

- Norfolk, Va.: New high alumina cement plant went on stream in 1978.

Marquette Co.

- Cape Girardeau, Mo.: New $80 million, 1.2-million-tpy dry process plant will replace existing 250,000 wet process plant at the same location. Kaiser Engineers is providing engineering, procurement, and construction services. Completion is scheduled for early 1981. Equipment supplied to include: Allis-Chalmers four-stage reinforced suspension preheater with a 14.5 ft. × 235 ft. rotary kiln section; Allis-Chalmers stoker-type grate clinker cooler; two Allis-Chalmers 13 ft. × 52 ft., 4500-hp Compeb finish mills; C-E Raymond raw roller mill rated at 250 tph and driven by a 3000-hp. motor; two Raymond 21 ft. diameter air separators for the finish mills, two C-E Raymond bowl-type coal mills; Envirotech-Buell electrostatic precipitator; baghouses; cyclone dust collectors. Instrumentation will be a combination of Eagle Signal, G & W Manufacturing Co. and Swanson Engineering Co. equipment and will incorporate an on-line computer system consisting of three CRT's with a complete plant display panel board.

Martin Marietta Corp.

- Buffalo, Iowa: New 850,000 $80 million dry process, coal-fired plant is scheduled to go on stream in 1981. Equipment to be supplied includes: F. L. Smidth preheater/precalciner kiln with 14 ft. × 200 ft. rotary kiln section and a 924S Folax grate cooler; Allis-Chalmers multi-compartment rotary Compeb mill, 15 ft. × 53 ft., 7,000 hp; 230 tph roller mill, 1500 hp. Kaiser Engineers is providing engineering and design services.
- Utah: Lafarge Consultants Ltd. (Montreal) and Fuller Co. are conducting parallel preliminary studies for a proposed new dry process cement plant of 500,000 tpy capacity for state of Utah.
- Lyons, Colo.: Long-kiln, dry process plant conversion to flash calcining system via a $6.8 million contract with Fuller Co. The 14 ft. 3 in. × 17 ft. × 490 ft. rotary kiln will be cut to 14 ft. 3 in. × 245 ft. A Fuller SF 135 suspension flash calciner with a modified Stage IV cyclone will be used to preheat and partially calcine the raw materials. The plant's existing direct coal-fired system will be converted to a semi-direct system to permit use of pulverized coal for both the kiln and the flash calciner. After the conversion, rated capacity will be 1,250 tpd. Kerogens in the shale portion of the raw materials will be burned off in the flash calciner. Start-up is scheduled for the first quarter of 1980.

Medusa Corp.

- Charlevoix, Mich.: Converting from wet to dry process in a $50 million project scheduled for completion in the spring of 1980. Kaiser Engineers have contract to provide engineering, procurement, and construction management services. Capacity will increase from the present 2,400 tpd to 4,400 tpd in the dry process. Equipment includes: Fuller SF-141 four-stage suspension preheater/flash calciner system; AAF-Elex electrostatic precipitator; Polysius 360-tph double-roller raw mill; C-E Raymond coal bowl mill; Fuller Airmerge blending system; gravel-bed clinker cooler; Foxboro SPEC 200 electric control. The existing 18 ft. 6 in. × 17ft. × 18 ft. 6 in. × 580 ft. rotary kiln will be cut to 18 ft. 6 in. × 17 ft. × 350 ft. length.

Monolith Portland Cement Co.

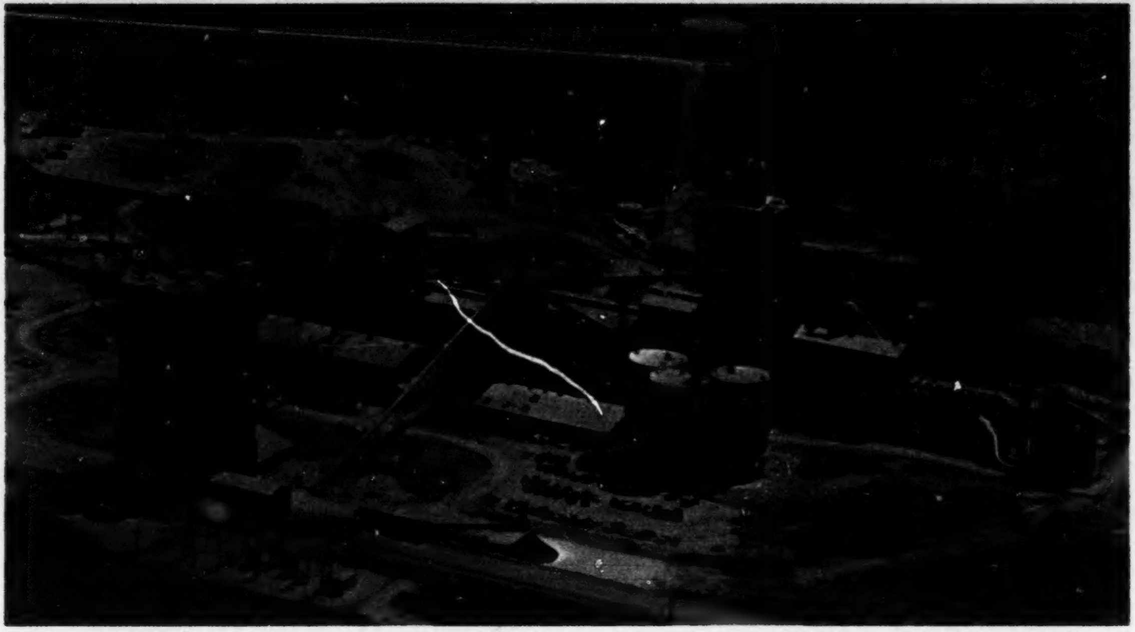
- Laramie, Wyo.: Doubling capacity to one million tpy. Equipment ordered includes: F. L. Smidth 12 ft. × 13 ft. 6 in. × 450 ft. wet process rotary kiln rated at 900 tpd; Folax clinker cooler; Tirax coal mill.

National Cement Co., Inc.

- Ragland, Ala.: In 1978, completed Phase II of its expansion program to increase capacity from 360,000 to one million tpy. Second phase of the program included a distribution and storage system for limestone, shale, sand, and material storage silos. A Loesche coal mill and a Wheelabrator-Frye/Lurgi evaporative cooling tower were also installed. In the first phase of the program, a Fuller four-stage suspension preheater unit with a precalciner alkali bypass system was installed. The existing 500 ft. rotary kiln was shortened to about 300 ft. Most of the engineering work was handled by the Austin Co.

OKC Corp. (Oklahoma Cement Co. Div.)

- Pryor, Okla.: A $28 million expansion program to increase capacity 280,000 tpy was scheduled for 1979 start-up. Fuller Co. supplied most of the equipment, including: 12 ft. × 13 ft. 6 in. × 400 ft. rotary kiln; grate clinker cooler; 12 ft. × 26 ft. two-compartment ball mill; bag-type dust collectors. A C-E Raymond coal mill was also installed. This is a Kaiser Engineers project.



Suspension preheater kiln system was incorporated in Texas Cement's new 500,000 tpy Buda, Texas plant which went onstream in 1978.

Oregon Portland Cement Co.

- Durkee, Ore.: New 500,000-tpy, $37-million dry-process plant placed on stream in 1979. F. L. Smidth supplied most of the equipment, including: four-stage cyclone preheater unit with rotary kiln section and Unax cooler; 2,100-hp Tirax Unidan drying and grinding mill; homogenization system; 4.35 × 66m gas conditioning tower and precipitator; Tirax coal mill; 4,000-hp Unidan 13 ft. × 47 ft. 3 in. finish mill; cement coolers; electrostatic precipitators.

Portland Cement Co. of Utah (Lone Star Industries, Inc.)

- Salt Lake City, Utah: Adding an Allis-Chalmers 11 ft. × 300 ft. kiln to replace two small kilns and increase plant capacity 30% to 420,000 tpy (wet process). Other new equipment includes a Fuller grate cooler and a Wheelabrator filter bag dust collector. Donald R. Warren Co. is the engineering consultant. Scheduled on stream in 1979.

Rinker Materials Corp.

- Miami, Fla.: Lafarge Consultants Ltd. (Montreal, Canada) has been awarded a contract to provide design and detail engineering services to convert two existing raw grinding mills to a closed-circuit finish grinding facility. The project involves new feed bins, weighfeeders, mill discharge equipment, air separators, dust collectors, and a cement transport system to storage.

SME Cement, Inc.

- Middle Branch, Ohio: Former Diamond Portland Cement Co. plant, purchased in 1960 by Flintkote, was sold by Flintkote to Standard Machine and Equipment Co. in 1977. The plant was incorporated as SME Cement Inc. in 1978 as a wholly owned subsidiary of Standard Machine & Equipment. Two of the plant's kilns, all of which had been shut down, were again placed in operation in 1979, with an estimated capacity of 1,000 tpd.

S.D. Cement Commission

- Rapid City, S.D.: New 1,650-tpd, $27.8 million suspension preheater plant on stream in 1978. Major equipment, supplied by the Fuller Co., included: 15 ft. × 220 ft. rotary kiln section with a four-stage suspenson preheater; grate clinker cooler; LM-27 Loesche roller mill with auxiliary air heater; 13 ft. × 40 ft. finish mill with 22 ft. diameter separator; Airmerge blending, storage and kiln feed: dust collectors.

Southdown, Inc. (Southwestern Portland Cement Co.)

- Odessa, Tex. (Southwest Div.): Modernization program completed in 1978 added 250,000-tpy capacity to existing 290,000-tpy plant. Equipment supplied: Fuller four-stage preheater with 11 ft. 3 in. × 53 ft. rotary kiln section; clinker cooler; dust collectors; 15 ft. × 22 ft. 3 in. ball mill; Allis-Chalmers 13 ft. × 45 ft. Compeb diaphragm mill.

Texas Cement Co.

- Buda, Tex.: New 500,000-tpy, $32 million dry process plant was placed on stream in 1978. Equipment supplied included: Fuller Traylor four-stage suspension preheater kiln system with 13 ft. 6 in. × 190 ft. rotary kiln section; Fuller-Loesche LM-243 raw roller mill; grate-type clinker cooling system; 12 ft. 6 in. × 39 ft. two-compartment finish mill; Airmerge blending system; cement cooler; baghouse dust collectors.

Texas Industries, Inc.

- Hunter, Tex.: New 550,000-tpy, $50 million dry process plant scheduled to go on stream in late 1979. Equipment includes a Polysius precalcining AS system with a 3.8 × 56m rotary kiln section rated at 1,700 mtpd.

Aggregates, other major nonmetals

Progress of 1979 faces slowdown in 1980

BY SANDY HEROD
and
SID LEVINE

Our annual PIT & QUARRY survey of the aggregate industries involves the mailing of questionnaires to several thousand top management and operating men in the sand and gravel, crushed stone and lightweight aggregates industries.

To keep tab of year-to-year trends, information is requested on such factors as production levels, pricing, labor and maintenance costs. The tabulation and analysis of these data provide the framework for the review elements of this report.

The outlook for the coming year is studied in the light of information submitted in answer to queries concerning the individual respondents' expectations for business in his area and his plans, if any, for new plants, replacement of old equipment and expansion projects.

An accompanying table summarizes the data derived from the tabulation of information submitted on those points. In view of the fact that the annual surveys are conducted early in the fourth quarter of the year, producers are asked to make full year estimates on certain factors.

The return from every individual respondent is kept strictly confidential and none is individually identifiable in these reports. Information submitted is tabulated on a regional basis; those data then are recapitulated to arrive at the weighted national averages shown in the summary.

Total production figures arrived at from our PIT & QUARRY survey will display variance with those presented by national industry associations; this is because we survey only *aggregate* producers. Figures submitted by national associations on the tonnage of crushed stone, sand and gravel, etc., include such uses as cement and lime manufacture, metallurgy, foundries, glass manufacture and other major industrial markets.

- A year ago, we offered the opinion that aggregate production in 1978 maintained the upward trend that had been reinitiated three years previously. That position has been verified by both the government's commodity reports and data received in our own survey.

According to the Mineral Industry Survey reports for 1978, prepared by the Division of Nonmetallic Minerals of the Bureau of Mines, the combined production of sand and gravel, crushed stone and slag amounted to 1.8 billion tons; about 13.9 million tons of lightweight aggregates were produced.

Based on the information supplied by respondents to our latest survey, it appears that two of the standard weight aggregate categories, (sand and gravel and crushed stone) recorded an increase during 1979 while slag output remained at about the level of the previous year. Combined volume shows an apparent gain of about 3%.

- Our projection of survey data leads to an estimated production of sand and gravel in 1979 at the 1 billion ton level, an increase in output of crushed stone to nearly 860 million tons (aggregates and similar products only), an apparent processing rate of 35 million tons for slag (other than lightweight expanded material), and a combined output of all lightweight aggregates reaching 14 million tons.

The number of respondents to our 1979 survey indicating an anticipated increase in business during 1980 dropped from the

Summary of Pit & Quarry's 1979 Aggregate Survey

	Sand & Gravel	Crushed Stone	Lightweight Aggregate
Review of 1979			
Production (+ or −)	+ 7%	+ 3%	+ 1%
Pricing of product			
raised (% of replies)	84	82	91
Avg. % raised (weighted)	+11	+10	+ 9
Wages			
raised (% of replies)	90	95	95
Avg. % raised (weighted)	+ 9	+10	+10
Maintenance costs			
up (% of replies)	90	88	86
avg. % of increase (weighted)	+17	+18	+16
Outlook for 1980			
Gain expected (% of replies)	39	33	36
Avg. (weighted) gain expected	+14	+16	+21
Drop expected (% of replies)	9	21	32
Avg. (weighted) drop expected	−13	−16	−16
No change expected (% of replies)	37	34	32
Unsure (% of replies)	8	4	0
Plans reported (% of replies)			
New plants	7	9	14
Plant expansion	16	16	18
Equipment replacement	27	30	50

This table summarizes various major factors reviewed in Pit & Quarry's annual survey of aggregate producers excepting slag which is discussed in an accompanying association commentary. As applicable, the figures indicate percent of change.

number who, last year, expressed that opinion for 1979 business.

However, the percentage of optimists within each category of aggregate producers was close. The same holds true for the percentages of respondents who felt that the coming year would be at least as favorable as the past one.

Along with the review and forecast data on sand and gravel, crushed stone and lightweight aggregates, this report reviews the latest statistics available (1978) on other major nonmetallic industries including lime, gypsum, agricultural limestone, phosphate rock, potash, barite, talc, feldspar and fluorspar.

Lime production for 1979 is expected to show a one percent gain over 1978. The leading uses for lime in 1978 were in steel furnaces, alkalies, water treatment, and pulp and paper. Gypsum mined in the United States set a new annual record in 1979 because of the continuing building activity.

Marketable phosphate rock production showed a 6% gain in 1978, with similar annual growth indicated for 1979 and 1980. The principal domestic markets were fertilizers and animal feed supplements, and industrial and food grade products. Domestic potash production, up 2% in 1978, shows indication of increases in annual growth rate for 1979 and 1980. About 95% of the total potash output is used directly in the fertilizer industry.

Drilling muds continue as the main end-use for barite, which reached a record output in 1978. An annual growth rate of 3% is indicated for 1979 and 1980. Feldspar and talc showed slight gains in production in 1978, and crude fluorspar output decreased.

Sand and gravel

Information submitted by respondents to our recently completed survey of the industry indicates that this industry experienced continued growth during 1978; the Bureau of Mines Mineral Industry Report for that year substantiates the gain which amounted to 7%. Total tonnage was about 963 million, valued at $2 billion (construction aggregates only).

A further increase was recorded during the past year, our survey indicates, with estimated production for all of 1979 nearly reaching the 1 billion ton level—another 7% gain.

The numbers of respondents in our 1979 survey who are optimistic about the coming year dropped about one-third from those of that persuasion a year ago.

Since production levels alone do not show the complete picture of the condition of the industries, our survey seeks information on such basics as trends in pricing, labor cost, maintenance factors and tons/manhour.

- With respect to the cost of labor, it would only be surprising if the upward trend had been arrested; and it has not been. However, the weighted national average of 9% higher wage levels, reported by 90% of our respondents, compares favorably with the 14% increase reported for 1978. Unfortunately, there was no measurable change in productivity to match the increase in labor cost. Regionally, the western and north central regions of the country lead the rest with the highest wage scales.
- The sharp increases in maintenance costs, indicated in preceding surveys, continue to hobble producers. With 90% of our 1979 respondents reporting increases that average out nationally (weighted) at 17%, there exists an almost exact duplication of their situation a year ago. Along with the higher cost of maintenance labor, parts availability, particularly with respect to wear metal components, was far and away the most troublesome for the industry's operators.
- Prices were raised last year by 84% of our respondents (3% more than in 1978), and the weighted national average increase of 11% was virtually the same as reported for 1978. With consistently substantial annual increases in at least two major costs of operating, the return from higher prices is appreciably minimized.

Outlook

A lesser number of respondents (39%) look for further improvement in business in 1980 than was the case a year ago with respect to 1979. However, the weighted average gain expected (14%) is about the same as proposed a year ago. Further, another 37% of our replies indicate the feeling that the coming year will be on a par with the past one. Only 9% of the survey questionnaires note an expected decrease in business volume.

In view of the existing and potential economic factors in our economy that have an impact on construction, we feel that, despite the industry's capability, it will not be called upon to deliver at the rate of last year. It is estimated that production will drop back toward the 1978 level of about 960 million tons.

Crushed stone

In reporting last year on our survey of this industry for 1978, we pointed to a probable increase of about 6% in production volume over the preceding year. As it turned out, according to final Bureau of Mines statistics, the increase was nearly twice that and production of nearly 835 million tons, valued at $2.1 billion, was recorded.

According to our latest survey, an increase of 3% was realized during 1979 which would result in a volume of 859 million tons last year.

About one-third fewer of our respondents reported optimism for 1980 than was found with respect to 1979 a year ago. However, an almost identical number (34%) expressed the opinion that the coming year will be as active as the last.

Even on a weighted basis, as seen in the accompanying table, the national average of expected increases reported appears overly optimistic. As indicated at the conclusion of this discussion, the average has been tempered through consideration of interest rates, inflation and other factors that influence construction.

- Our tabulation of survey returns by region indicates that all registered an increase in production during 1979, the highest rate being found in the West. The weighted national average of all regions was 7%, just 1% above that recorded in the 1978 survey. Interestingly, no measurable change in the tons/manhour factor could be found in the analysis of returns.

- No surprises are found in the data submitted on labor costs—costs continued to rise, with the weighted national average being an increase of 10%. This is based on returns of 95% of our respondents to the crushed stone survey, and is two percentage points above the increase reported for the preceding year.
- The cost of keeping equipment—mobile and stationary—in operation becomes steadily higher. Nationally, the industry's producers experienced a climb of 18% in this troublesome cost center. Individually, none of the regions varied more than a couple of percentage points from that average which was 4% higher than reported for 1978.

While there were scattered references in this survey to specific types of equipment such as drills, loaders, screens, etc., as major problems in the maintenance area, by far the most common problems and complaints cited were parts availability and service, wear metal (primarily crusher components) and incompetent maintenance labor.

- Far from offsetting the increases in operating costs noted above, the industry-wide increase reported in pricing was required to achieve even a minimal profit. The weighted national average increase, based on reponses in 82% of survey returns, was on the order of 10%—just 2% over that posted in 1978.

Outlook

It was noted earlier that some two-thirds of our respondents were optimistic concerning 1980 either to the extent of outright prediction of an increase in business or expressed anticipation of market demand at least equal to that in 1979. They were divided nearly 50/50 between the two viewpoints.

However, 21% of all who furnished information for this survey indicated they look for a drop in 1980. This is three times as many as those who held that opinion a year ago with respect to 1979's potential. They look for a 16% decline (weighted average), the same rate of change that the most optimistic propose as a gain.

Considering the current and potential levels of money rates, and the long-term impact of inflation levels, it cannot be realistically proposed here that the industry will record further gains this year. No precipitate decline is expected, but rather a decrease on the order of 3-4%, which would result in a 1980 output of about 833 million tons—approximately equal to the 1978 level.

Lightweight aggregates

Respondents to our 1978 survey of lightweight aggregate producers—both natural and manufactured types—supplied preliminary figures for the full year that indicated production increase of nearly 13% over the preceding year.

According to final government figures on these materials for that year, there was a gain of 10% in the combined output of expanded clay, shale and slate, pumice, expanded slag, expanded perlite and exfoliated vermiculite. The total was about 13.9 million tons.

Our 1979 survey returns reflect a considerably more modest rate of climb during 1979 (combined basis) to an estimated level of 14 million tons.

Despite the fact that the majority of producers of lightweight aggregates find themselves in a seller's market of high demand, most of them who employ pyro-processing in production systems face severe problems with respect to fuels and air quality regulations. In the face of these concerns, it is not surprising that they are unable to realize full market potential, and gained only an estimated 1% last year.

- While, as a group, the various lightweight aggregates were produced at a minimally higher rate last year, the increases in major cost centers paralleled those experienced by producers of standard weight aggregates.

Labor costs, as indicated in 95% of the survey returns, rose by 10% as compared with 9% for the preceding year; and 86% of our respondents noted further increases in maintenance expenditures, with the national average determined to be 16%.

- While prices were raised last year at a national average of 9%, the extent of that raise still was below those of both labor and maintenance costs.

Outlook

The number of plants producing lightweight aggregates with pyro-processing has declined. Those producers who thus far have been able to surmount the difficulties of fuel availability and the high cost of EPA-mandated pollution control equipment have generally geared up to meet market demand as well as they can, and, as indicated in the table, about one-third anticipate a substantial increase in business for 1980.

However, another third predict a decline while the remainder feel that there will be no change from 1979. In consideration of the industry's built-in problems, along with the projected decrease in building construction, it is expected that lightweight aggregate production will decline during the coming year to a level of about 13.6 million tons.

Lime

Total U.S. lime production for 1979 will probably show a 1% increase over the 20.484 million short tons sold or used by producers in 1978. The projected slowdown in the economy is expected to lower lime output by about 5% in 1980. The record for lime output was 21.645 million short tons, set in 1974.

There were 165 lime plants in the United States in 1978, compared with 161 in 1977 and 163 in 1976. Leading producing states in 1978 were Ohio, Pennsylvania, Missouri, Texas, and Michigan, accounting for 50% of the total output. Ten companies, operating 30 plants, accounted for 43% of the total production. Captive lime used by producers in 1978 amounted to about 26% of total production.

The total value of lime sold or used by U.S. producers was $743 million, a 12% increase over the previous year. The average price per ton at the plant has risen from

$13.39 in 1968 to $36.76 in 1978.

The leading individual uses for lime in 1978 were in steel furnaces, alkalies, water treatment, and pulp and paper. For commercial (open-market) lime, sales for chemical and industrial uses were 88%; for construction (including road stabilization), 7%; refractories (dead-burned dolomite), 5%. Captive lime used by producers accounted for about 25% of the total lime production.

Average production percentages by type for the five-year period from 1973 to 1977 were: quicklime, 82.5%; hydrated lime, 12.2%; dead-burned dolomite, 5.3%. Imports in 1978 amounted to 610,000 short tons, and exports totaled 45,000 tons.

Although aglime production for both the calcined product and agricultural limestone has decreased in the past two years, an increase of several percent is anticipated for 1980. Total sales of lime for agriculture in 1978 amounted to 71,884 tons, down 9% from 1977. Total sales of agricultural limestone in 1978 was 30.697 million tons, a 2% decrease from 1977. The estimated production decrease for 1979 is between 4-6% for aglime.

Gypsum

In 1978, producers at 69 mines and quarries in 22 states mined 14.891 million short tons of crude gypsum. This was an 11% increase over 1977, and a new all-time annual record. Imports of gypsum rock for consumption totaled 8.308 million tons, and by-product gypsum provided an additional 669,000 tons of crude gypsum. Buildup of crude gypsum inventory and indications of a dip in building could lead to a 5% drop in gypsum supply in 1979 and in 1980.

In order of total output, the leading individual mines in 1978 were: U.S. Gypsum's Alabaster mine in Iosco County, Mich.; U.S. Gypsum's Plaster City mine in Imperial County, Calif.; National Gypsum's Tawas mine in Iosco County, Mich.; U.S. Gypsum's Southard mine in Blaine County, Okla.; National Gypsum's Shoals mine in Martin County, Ind.; U.S. Gypsum's Shoals mine in Martin County, Ind.; Pacific Coast Building Products' Las Vegas mine in Clark County, Nev.; U.S. Gypsum's Sweetwater mine in Nolan County, Tex.; Georgia-Pacific's Acme mine in Hardeman County, Tex.; Weyerhaeuser's Briar mine in Howard County, Ark. These mines accounted for 47% of the total.

Calcined gypsum production in the U.S. amounted to 14.041 million short tons in 1978. Gypsum was calcined at 71 plants in 29 states. In order of total output, the leading individual plants in 1978 were: U.S. Gypsum's Plaster City plant, Imperial County, Calif.; U.S. Gypsum's Stony Point plant, Rockland County, N.Y.; U.S. Gypsum's Detroit plant, Wayne County, Mich.; Weyerhaeuser's Briar plant, Howard County, Ark.; U.S. Gypsum's Shoals plant, Martin County, Ind.; U.S. Gypsum's Southard plant, Blaine County, Okla.; Georgia-Pacific's Acme plant, Hardeman County, Tex.; Pacific Coast Building Products' Apex plant, Clark County, Nev.; U.S. Gypsum's Duval plant, Duval County, Fla.; U.S. Gypsum's Sweetwater plant, Nolan County, Tex. These 10 plants accounted for 29% of the total.

Of the 5.881 million tons of uncalcined gypsum sold or used in the U.S. in 1978, portland cement accounted for 71.6%; agriculture for 25.6%; fillers and miscellaneous uses, 2.8%. Production of calcined gypsum amounted to 14.041 million tons in 1978, and production of gypsum products made from calcined domestic, imported, and by-product gypsum totaled 15.708 million tons.

Prefabricated products accounted for 94.2% of total calcined products; industrial plaster, 2.5%; building plaster, 3.3%. Prefabricated products production amounted to 16.445 million "thousand square feet" units of lath, veneer base, sheathing, regular gypsum board, Type X gypsum board, predecorated wallboard, and other products.

Total values for the 1978 production and sales were: crude gypsum mined, $92.726 million; calcined gypsum produced, $387.010 million; gypsum products sold, $1.248 billion; imports for consumption of gypsum and gypsum products, $63.882 million; exports of gypsum and gypsum products, $19.804 million. Average values of crude gypsum per ton (FOB mine) have risen from $3.67 in 1968 to $6.23 in 1978.

Phosphate rock

Mine production of phosphate rock in the United States in 1978 amounted to 173.429 million metric tons, and marketable production totaled 50.037 million metric tons, a 6% gain over 1977. Apparent consumption (measured by amount sold or used plus imports minus exports) amounted to 37.112 million metric tons. Production will probably continue at the same annual rate through 1979 and 1980.

Marketable phosphate rock was produced by 23 companies in 1978. Ten of the companies produced 79% of the total U.S. production from mines in Florida. The percent production distribution pattern by state was: Florida and North Carolina, 86%; Idaho, Montana, Utah and Wyoming, 10%; and Tennessee, 4%. Exports amounted to 12.570 million metric tons, and imports for consumption totaled 908,000 metric tons.

The principal domestic markets for phosphate rock in 1978 were: fertilizers and animal feed supplements, 88%; industrial and food grade products, 12%. Uses of 36.204 million metric tons of phosphate rock sold or used domestically by producers in the U.S. were: wet-process phosphoric acid, 81.0%; normal superphosphate, 0.8%; triple superphosphate, 4.9%; defluorinated rock, 0.5%; direct applications, 0.1%; elemental phosphorus, 12.1%; ferrophosphorus, 0.6%.

The total value of marketable phosphate rock produced in the U.S. in 1978 was $928.82 million. The average unit price was $18.56 per metric ton (FOB plant) in 1978, as compared with the $21.26 and $17.39 per metric ton reported in 1976 and 1977, respectively. The value of exports increased from $21.81 per metric ton in 1977 to $23.08 per metric ton in 1978, FOB plant. Imports, principally from Morocco, increased to 908,000 metric tons at an average value of $26.85 per metric ton (customs import value).

Potash

Potash production in the U.S. in 1978 amounted to 4.326 million metric tons (2.253 million metric tons K_2O equivalent). Imports for consumption totaled 7.762 million metric tons (4.705 million m.t. K_2O equivalent), and exports amounted to 1.431 million m.t. (0.809 million m.t. K_2O equivalent).

Apparent consumption was 10.689 million m.t. (6.203 million m.t. K_2O equivalent). The 1979 and 1980 production may show a 4% annual increase above the 1978 apparent consumption data. The value of potash sales by producers was $226.5 million in 1978; exports were valued at $88.6 million; and the customs value of imports of potash for consumption totaled $399.2 million. The average value of potash sold by producers has increased from $24.58 per m.t. in 1971 to $51.97 per m.t. in 1978.

Potash production was centered in eastern New Mexico in 1978, where seven companies operating eight mines by conventional mining of bedded deposits produced 85% of the U.S. total. One mine in Utah recovered potash by dissolving it in water underground and pumping it to the surface for recovery. Two plants in Utah and one in California recovered potash from salt lakes or natural brines. Ten companies comprise the domestic industry. Most potash is produced as potassium chloride (potassium muriate). About 95% of the total output is used directly in the fertilizer industry.

Barite

U.S. mine production of barite ($BaSO_4$) sold or used rose to a record 2.112 million short tons in 1978. Imports of crude barite increased to a record high of 1.291 million short tons, and exports amounted to 37,000 tons. Crushed and ground barite sold or used by producers in 1978 amounted to 2.702 million short tons, and barium chemicals sold or used by producers amounted to 55,000 short tons. The average annual growth rate for crude barite may be expected to increase about 3% for 1979 and 1980.

Nevada is still the leading producing state with 85% of the total production in 1978. Other producing states in descending order of production were Missouri, Arkansas, Georgia, Montana, Idaho, Tennessee, and Illinois. Crushed and ground barite was sold by 38 plants in 1978, and barium chemicals were produced and sold by six plants in the U.S.

Drilling muds for the oil and gas industry continued as the dominant end use, accounting for 92% of total sales. Other uses for barite include applications in paints, glass and rubber, as well as the production of barium chemicals.

The total value of primary (crude) barite sold or used by producers in the U.S. in 1978 amounted to $43.980 million. Imports were valued at $40.525 million; exports at $2.341 million; crushed and ground barite at $123.433 million; and barium chemicals at $23.772 million.

Feldspar

Feldspar production totaled 735,000 short tons, valued at $18.2 million in 1978. Feldspar was mined in 10 states, with North Carolina in the lead, followed by Connecticut and Georgia. The other producing states, in descending order, were California, Oklahoma, South Dakota, Arizona, Wyoming, Colorado, and Maine.

Imports for consumption in 1978 amounted to 39 short tons. Exports amounted to 10,331 tons, valued at $853,000. The 1978 end-use distribution of domestic feldspar was: glass, 60%; ceramics (pottery), 30%; coating and plating (porcelain enamel) and miscellaneous applications, 10%. Production in 1979 and 1980 will probably be equivalent to the 1978 quantity.

Fluorspar

Mine production of crude fluorspar in 1978 amounted to 447,876 short tons, and shipments of finished fluorspar from domestic mining operations totaled 129,428 short tons valued at $13.261 million FOB mine. Almost 90% of the total U.S. shipments came from Illinois. Mine production was reported by three producing firms operating eight mines in Illinois and one mine each in Arizona, Nevada, and Texas.

Imports for consumption amounted to 916,705 tons valued at $67.6 million. Exports amounted to 8,287 tons with a value of $978,000. Major industrial demand for fluorspar comprised: steel production, 50%; fluorcarbons and miscellaneous fluorine compounds, 20%; primary aluminum, 16%; others, 14%. A one percent increase in demand is anticipated through 1985.

Talc

Mine production of crude talc in the U.S. in 1978 amounted to 1.268 million short tons valued at $14.956 million. Crude pyrophyllite mined totaled 116,000 tons valued at $811,000. Talc sold or used by producers amounted to 1.155 million tons (valued at $68.781 million), and pyrophyllite sold or used amounted to 116,000 tons (valued at $2.804 million).

Talc, including soapstone, was produced at 38 mines in 12 states in 1978. The states producing the highest tonnage, in decreasing order, were Montana, Vermont, Texas, and New York. California, with 13 mines, has the largest number for any state. The pyrophyllite-producing mines in the U.S. in 1978 were all in North Carolina. Four companies operated six mines during the year.

Talc was consumed domestically in 1978 for the following applications: ceramics, 32%; paints, 22%; plastics, 13%; cosmetics, 8%; paper, 7%; rubber, 6%; insecticides, 3%; roofing, 3%; minor uses, 6%. Pyrophyllite consumption was mainly in refractories (52%), insecticides (25%), and ceramics (17%).

Imports for consumption in 1978 amounted to 19,000 tons, valued at $1.944 million; and exports totaled 267,000 tons, valued at $12.359 million. From a 1977 base, domestic demand for talc and related minerals is expected to increase at an average annual rate of about 4% through 1985. ●

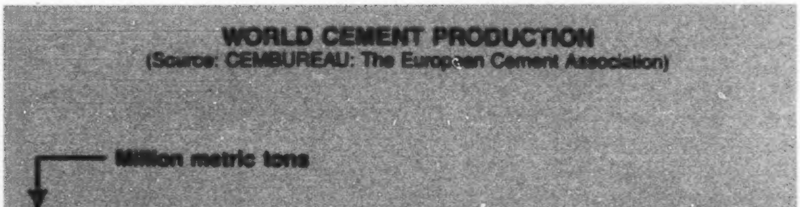
The international cement scene

Plant and production update: 1980

BY SID LEVINE

World cement production for 1979 is expected to show an increase of 5% above the 1978 record of 840.6 million metric tons. In 1980, the world cement market is expected to rise about 4-5% with the largest increases (8-10%) taking place in Asia and Africa.

Asia's production was 28% (235.4 million metric tons) of the world total in 1978. Western Europe accounted for 25.51% (214.4 mmt); Eastern Europe (including the U.S.S.R.), 24.98% (210.0 mmt); the Americas, 17.61% (148.1 mmt); Africa, 3.18% (26.7 mmt); Australia and the rest of the world, 0.72% (6.0 mmt).



Source Photo of Kiln Firing Segment Courtesy of Canada Cement La Farge Ltd.

The twelve leading cement-producing countries in 1978 were: U.S.S.R., 129.3 million metric tons; Japan, 84.4 mmt; U.S.A., 71.6 mmt; China, 54 mmt; Italy, 38.5 mmt; Germany, 33 mmt; Spain, 32.1 mmt; France, 30.3 mmt; Brazil, 22.5 mmt; Poland, 21.7 mmt; India, 19.6 mmt; United Kingdom, 16.6 mmt.

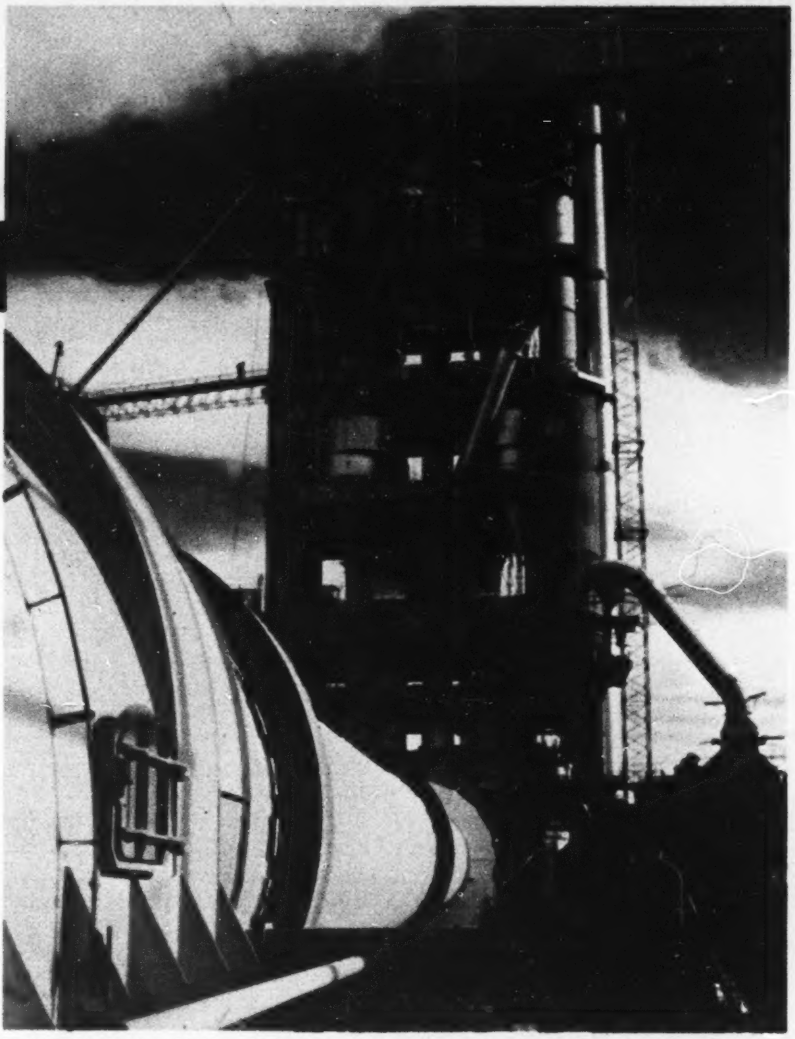
Latin America's current construction boom may lead to a cement shortage in several of the countries. Mexico may introduce a program to increase cement production capacity by 30% every three years. Argentina, while currently self-sufficient in cement capacity, has an extensive construction program planned. Chile is said to expect an 8 to 10% construction growth rate. Cement consumption only rose about 1% in the Cembureau* cement market. The Cembureau predicts that its total cement market will remain practically unchanged in 1979 and 1980.

Small scale production via mini cement plants again are beginning to attract interest. This approach is said to be based on socioeconomic considerations rather than on the advantages of large-scale plants. A mini plant is defined as one with a capacity of 100,000 mtpy or less.

In this annual survey, PIT & QUARRY provides projected operational dates for new cement plants and plant extensions, and lists projects that went into operation in 1978 and 1979. Where data were available, cement production quantities or estimated capacities are given for the 1975-1979 period for the various countries.

**Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and United Kingdom.*

AFRICA



ALGERIA: Societe Nationale des Materiaux de Construction. Added new 1 million mtpy production line at Zahana *(Courtesy: Prospective Engineering Gestion)*

Algeria

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.955	1.321	1.620	6.5	7.5

- Ain el Kebira (25 km. north of Setif). Capacity: 1 million mtpy. Onstream: 1978. Dry process (preheater-kiln arrangement); process computer. Major equipment suppliers: Humboldt Wedag and Hochtief AG. Consulting engineers: Technip and Lafarge Conseils et Etudes. SNMC (Societe Nationale des Materiaux de Construction) contract.
- Saida. Capacity: 500,000 mtpy. Onstream: 1978. Dry process (preheater-kiln). Major equipment supplier: Kawasaki Heavy Industries, Ltd. Consulting engineers: Lafarge Conseils et Etudes. SNMC contract award.
- El Asnam (250 km. from Algiers). Capacity: 1 million mtpy. Onstream: 1979. Dry process, suspension preheater, computer controlled. Major equipment suppliers: Kawasaki Heavy Industries, Ltd. and Marubeni Corp. SNMC contract.
- Zahana (35 km southeast of Oran). Adding new dry process production line with 1 million mtpy capacity. Fives-Cail Babcock supplying major equipment, including: 5.6×84 m rotary kiln, associated with a four-stage preheater; 5.2×12.75 m raw mill, 300 tph, 5,000 kw motor; 4.8×15.25 m finish mill, 4,900 kw motor. Electrical equipment: Brown Boveri. Process control equipment: Comsip (France). SNMC contract. Consulting engineers: Prospective Engineering Gestion. Scheduled onstream: 1978.
- Beni-Saf. Capacity: 1 million mtpy. Major equipment supplier: Creusot-Loire Enterprises. Dry process plant with 1,200 tph crusher; 270 tph raw mill; two 90 tph finish mills; 18 ft.×300 ft. rotary kiln. SNMC contract. Process control equipment: Comsip (France). Consulting engineers: Prospective Engineering Gestion. Scheduled onstream: 1979.
- Constantine. Capacity: 1 million mtpy. Major equipment supplier: Creusot-Loire Enterprises. Similar to Beni-Saf project. SNMC contract.
- Tebasse area (800 km east of Algiers). SNMC awarded Kawasaki Heavy Industries and the Marubeni Corp. contract in 1979 for new cement plant.

Quantities in million metric tons

Angola

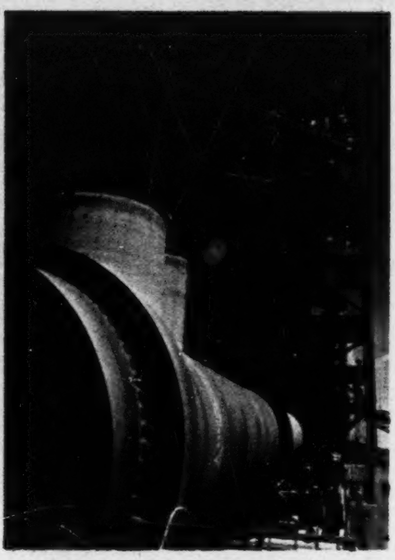
Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.400	0.150	0.200	0.900	0.900

Benin

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.170	0.175	0.180	—	0.45

- Two neighboring West African states, the People's Republic of Benin and the Federal Republic of Nigeria, have jointly awarded F. L. Smidth & Co. A/S a contract for the construction of a cement plant with a capacity of 500,000 tpy. The new plant, which is to be built in the Republic of Benin, will be owned by a limited company, Societe des Ciments d'Onigbolo (SCO), in which Benin and Nigeria will be represented by 49% and 41%, respectively, of the share capital. The remaining 10% will be subscribed by F. L. Smidth. In addition to supplies for the facility, Smidth will place at SCO's disposal the necessary

LIBYA: Libyan Cement Co.—Control panel at new 1 million mtpy dry process plant at Hawari. ***(Courtesy: Prospective Engineering Gestion)***



ALGERIA: Societe Nationale des Materiaux de Construction. Ain el Kebira plant (near Setif) is rated at 1 million mtpy ***(Courtesy: Humboldt Wedag)***

key personnel for daily operation and also will be in charge of training local labor who eventually will take over the plant's operation.

The dry process plant will include a Tirax raw mill, 4.6m × 8.25m, with a 4.4m drying chamber, a 1,600 tpd oil-fired four-stage preheater Unax kiln, 4.55 × 68m, and a Unidan cement mill, 3.8m × 12m. The project currently is under construction, with completion expected in 1982.

- Cotonou: 200,000 mtpy open-circuit grinding plant scheduled onstream in 1978 by the Societe Nationale de Ciment (SONACI). Consulting engineers: Prospective Engineering Gestion. Main equipment supplier: Koch (Germany).

Cameroon

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.251	0.303	0.405	0.06	0.06

Central African Empire

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.019	0.017	0.016	0.12	0.12

- Fatima (near Bangui). Projected 120,000 tpy plant.

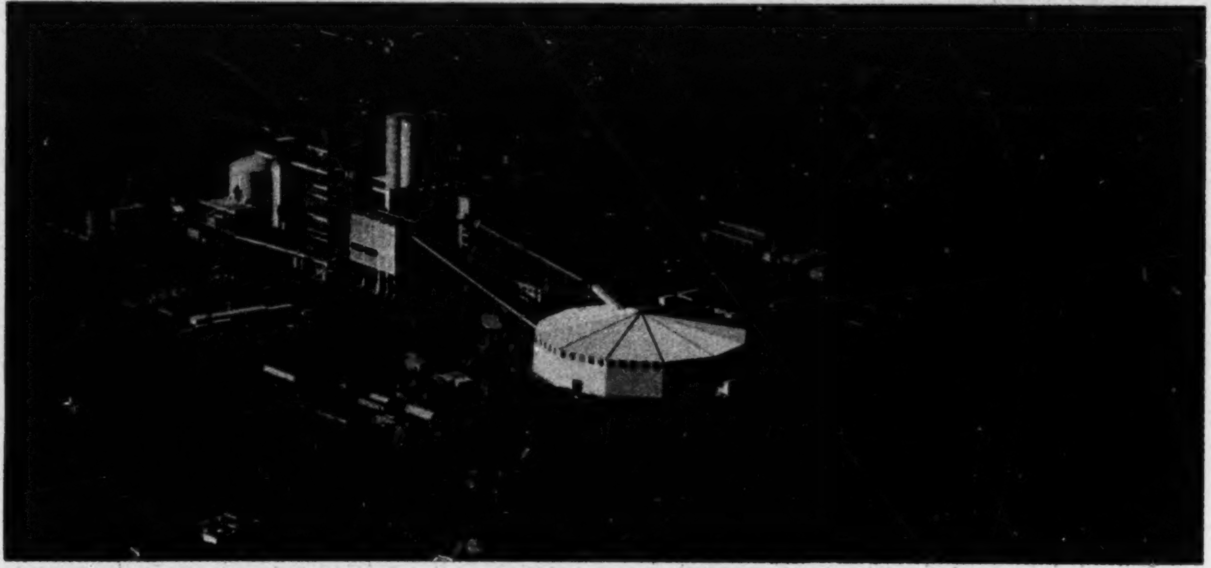
Congo Republic

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.055	0.049	0.060	0.08	0.08

Egypt, Arab Republic of

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
3.588	3.362	3.167	4.3	5.9

- Tourah Portland Cement Co.: Lecaire (Tourah). Adding 2,000 mtpd F. L. Smidth dry-process kiln equipped with cyclone preheater and a precalciner. Scheduled onstream: 1979.
- National Company for the Production of Cement: El-Tabbin (30 km south of Cairo). Adding 4,500 tpd production line. Major equipment suppliers are Humboldt Wedag and CGEE Alsthon S.A. Clinker will be produced in a 76m long × 5m diam. rotary kiln with a twin-type preheater and an additional in-line firing arrangement. Scheduled onstream: 1979. Dyckerhoff Zementwerke will supply consulting services.
- Alexandria Portland Cement Co. (Alexandria). Expansion, due on-stream in 1979.
- Suez Cement Co., Eastern Plant, south of Suez City: Building new 1 million mtpy plant. Fuller Co. supplying equipment, including 15 ft. × 42 ft. raw mill; SF-141 preheater with flash calciner; 15 ft. × 16 ft. × 240 ft. rotary kiln; two 15 ft. × 46 ft. finish mills; grate clinker cooler; blending and raw storage silos; Fuller-Kinyon systems; dust collectors; fluidizing gravity conveying systems. Ferguson International Co. is project manager and consultant. Participating are: Arab Consulting Engineers; Arab Swiss Engineering Co.; Coopers & Lybrand (Management Systems); Bendy Engineering Co. (Process Review); Morrison-Knudsen (Quarry Plan & Development); H. K. Ferguson, San Francisco Division (Coordination of U.S. Subcontractors, Purchasing, Expediting, Construction Estimate, and Portion of Engineering). Scheduled onstream: 1981.
- Suez Cement Co.: Second plant to be built in Quattamia (formerly East Maadi). Capacity: 1.4 million mtpy. Engineering and economic feasibility study by H. K. Ferguson Co., San Francisco Division.
- Helwan Portland Cement Co. (Helwan): Consortium formed by F. L. Smidth & Co. (Denmark) and Brown, Boveri & Co. (Switzerland) awarded contract by company to convert two existing wet process production lines to dry process. Both lines will incorporate F. L. Smidth precalcining systems with four-stage preheater kilns. Capacity: 3 million mtpy. Scheduled onstream: 1981.
- Helwan Portland Cement Corp. (Assiut). A 1.5 million mtpy plant is being built by a European consortium headed by Polysius. Equipment will include: four-stage Dopol heat exchanger; Prepol AS precalciner; rotary kiln; two raw-mix grinding mills with a capacity of 210 mtph each; one cement-grinding mill, 120 mtph; two cement-grinding mills, each rated at 83 mtph; raw materials handling and dressing plant; mixing beds for limestone and



MOROCCO: Asment de Temara. Rated at 500,000 mtpy, preheater equipped plant at Rabat went onstream in 1979. *(Courtesy: Fuller Co.)*

clay; raw mix homogenizing plant; clinker handling system; Polab II laboratory automation. Electrical equipment supplier: Brown Boveri. Bulk loading and bagging plant: Haver & Boecker. Consultants: Arab Swiss Engineering Co. Scheduled onstream: 1982.

Ethiopia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.117	0.126	0.113	—	—

Gabon

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.090	0.107	0.190	—	0.3

- N'toum (25 miles from Libreville). Societe des Ciments du Gabon. Capacity: 350,000 mtpy. Wet process using 460 ft.-long rotary kiln. Contract awarded to Creusot-Loire Entreprises and Lafarge Conseils & Etudes. Start-up scheduled for 1979.
- Franceville. Societe des Ciments du Gabon. Clinker-grinding plant. Capacity: 100,000 mtpy. Contract awarded to Creusot-Loire Entreprises and Lafarge Conseils & Etudes (France). Start-up scheduled for 1979.

Ghana (see also West Africa)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.666	0.679	0.565	0.9	1.3

- Tema. Ghana Cement Works Ltd. Expansion to double plant capacity to 800,000 tpy. Due onstream in 1979.

Guinea, Republic of

- Conakry. Contract awarded to Lafarge Conseils et Etudes for supervision of construction of clinker grinding plant in Conakry. Capacity: 250,000 mtpy. Start-up scheduled for 1980. The project is sponsored by the Government of the Republic of Guinea, represented by the Estate Committee for Cooperation with the Countries of the Arab League (Ministry of Planning and Cooperation).
- Three cement plant projects with a capacity of about 200,000 tpy are under consideration. Possible locations: Kindia (100 km east of Conakry); Lebekere (near the town of Mali on the Senegal border); Siguiri (on the Niger River near the Mali border).

Ivory Coast

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.710	0.800	0.961	—	—

- Clinker grinding plants only.

Kenya

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.897	0.987	1.137	1.5	1.5

- East African Portland Cement Co.—Athi River Works. Uprating of the cement works from 265,000 mtpy to 450,000 mtpy of pozzolanic cement. Additional slurry milling and cement milling capacity being installed. Consultants: Blue Circle Technical group.

Liberia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.090	0.105	0.110	—	—

- Liberia Cement Corp.: Monrovia. 9.5 ft. × 15 ft. finish grinding ball mill, 700 hp. Furnished by Allis-Chalmers. Onstream in 1978.

Libya (Libyan Arab Republic)

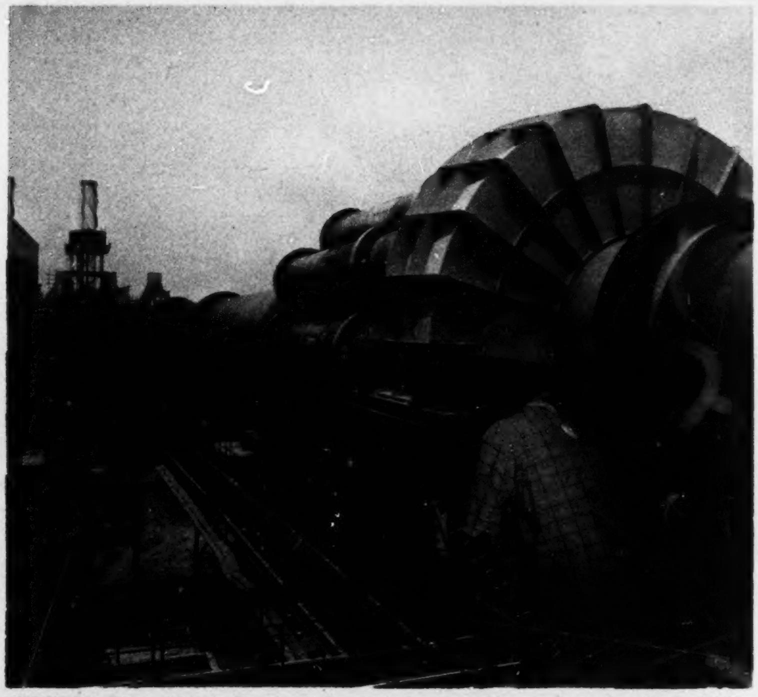
Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.500	0.664	1.000	3.9	4.4

- Hawari: The Libyan Cement Co. New 1 million tpy plant equipped with Humboldt preheater system. Equipment supplier: Humboldt Wedag. Electrical equipment supplier: Brown Boveri. Consulting engineers: Prospective Engineering Gestion. Placed onstream: 1978.
- Near Homs: National Cement & Building Materials Co. New 3,000 tpd dry process plant due onstream in 1979. Major equipment supplied by Fives-Cail Babcock (France) includes: four-stage cyclone preheater; 5.4m × 88m rotary kiln; grate cooler; 1,300 tph crusher for limestone and clay; 80 tph crusher for gypsum and iron ore; 270 tph raw grinding unit; clinker grinding station with two 100 tph closed-circuit ball mills.

Madagascar, Democratic Republic of (Malagasy Republic)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.058	0.070	0.052	0.06	0.06

Quantities in million metric tons



NIGERIA: West African Portland Cement Co. Ltd. Shagamu works. Second kiln (rated at 650,000 mtpy) of projected six-kiln plant, now onstream *(Courtesy: Blue Circle Industries Limited*

• E.S. Cement d'Antsirabe (Ibity, Province of Antsirabe). Contract awarded to Loesche GmbH for construction of new vertical kiln cement plant rated at 115,000 mtpy. Scheduled onstream in 1981.

Malawi

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.115	0.085	0.094	—	—

Mali

• At Astro (400 km west of Bamako). New dry process plant will be rated at 250,000 mtpy. Consulting engineers: Prospective Engineering Gestion. Scheduled onstream: 1983.

Morocco

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
2.028	2.216	2.604	3.9	4.8

• Rabat—Asment de Temara S.A. Capacity: 500,000 mtpy. Scheduled onstream: 1979. Consulting engineer: Technip and Lafarge Conseils et Etudes. Special adviser to the client and start-up supervisor: The SNC Group. Major equipment, supplied by the Fuller Co., includes 15 ft. × 220 ft. rotary kiln; four-stage suspension preheater; 3.962 × 13.4m raw mill; 3.962 × 12.929m finish mill; inclined grate clinker cooler; dust collectors; pneumatic conveying system.

Quantities in million metric tons

• Oujda—Cimenterie de l'Oriental. New 1 million mtpy dry process plant at Oujda incorporates two Polysius Dopol preheater kilns. The Blue Circle Group provided consultancy services. Plant scheduled for 1979 operation.

• Casablanca: Societe Nationale des Materiaux de Construction awarded contract for a new 1 million mtpy dry process plant to be built near Casablanca. The Blue Circle Group will provide the consultancy service. Operation is scheduled for 1980.

Mozambique

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.180	0.217	0.325	—	—

Niger

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.017	0.035	0.036	0.035	0.1

Nigeria

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.380	1.274	1.250	3.4	5.2

• Ashaka Cement Co.—Two-kiln plant, rated at 800,000 mtpy, near Ashaka on the Gongola River. Onstream: 1979. Blue Circle Group participated as management partners on project. Each Polysius Gepol preheater kiln is rated at 1,150 mtpd.

• Benue Cement Co. Ltd.—Yandev plant. New plant incorporating two production lines rated at 1,450 mtpd clinker each. Start-up scheduled for 1979. Major equipment, supplied by Humboldt Wedag, includes: two 4.4 × 64m rotary kilns equipped with four-stage Humboldt preheaters; two 4.4 × 8m tube mills for raw meal grinding.

• West African Portland Cement Co.: Shagamu (near Lagos) works. Designed to incorporate up to six kilns, of which two are installed. The first kiln was commissioned in 1977. The second kiln, rated at 650,000 mtpy, went onstream in 1978. Designers and builders: The Associated Portland Cement Manufacturers Limited (parent company of the Blue Circle Group). Equipment for a third 1,000 tpd production line has been ordered from F. L. Smidth.

• Upkilla Cement Co.—At Auchi: 300,000 tpy extension onstream in 1978. Incorporates a Polysius Gepol kiln. Owner's representative: The SNC Group (Canada).

Rhodesia, Southern

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.677	0.541	0.486	0.6	0.6

Senegal

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.361	0.386	0.330	0.35	0.38

South Africa, Republic of

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
7.176	7.046	6.573	8.6	8.6

Sudan

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.216	0.164	0.180	0.3	0.6

• Maspio Cement Corp.: Expanding Atbara plant. Major equipment, supplied by F. L. Smidth, includes: one 750 tpd rotary kiln, 15 ft. × 12½ ft. × 329 ft., with single-stage cyclone preheater and Unax planetary cooler; 10½ ft. × 30 ft. raw mill; 11 ft. × 36 ft. finish mill.

Tanzania

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.266	0.244	0.247	0.6	1.3

• Tanzania Saruji Corp.: Building a new plant at Tanga (in northeastern Tanzania). F. L.

Smidth supplying major equipment, including: one 1,600 tpd kiln, 15 ft. × 224 ft., with four-stage cyclone preheater and Unax planetary cooler; 15 ft. × 25 ft. raw mill; 14½ ft. × 43 ft. finish mill. Scheduled onstream in 1980.

• Tanzania Saruji Corp.: Awarded contract to F. L. Smidth to supply equipment for new 800 tpd plant at Mbeya in southwestern Tanzania. Major equipment includes: 4 × 6m, 1250 kW raw mill; 3.95 × 58m, 800 mtpd rotary equipped with a four-stage cyclone preheater and Unax planetary cooler; 3.4 × 12m, 1820 kW finish mill. Scheduled onstream in 1980.

Togo (see West Africa)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.150	0.157	0.239	—	1.2

• Ciments du Togo: Lome, Togo. Extending capacity of clinker grinding plant from 300,000 mtpy to 500,000 mtpy. Scheduled for completion in 1981. Consulting engineers: Prospective Engineering Gestion.

Tunisia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.616	0.485	0.615	1.25	3.0

• Societe des Industries Cimentieres du Centre (SICC) has signed a contract with Holderbank Management and Consulting Ltd. for the engineering and project management of a cement plant to be built near Enfida (100 km east of Tunisia). The plant will be rated at 1 million tpy. Production is slated for 1982 start-up. Equipment will be supplied by Kawasaki Heavy Industries in cooperation with C. Itoh & Co. and Marubeni Corp. Pyroprocessing unit will include a Kawasaki suspension preheater.

• Djebel Oum El Khelil cement plant: 3,000 tpd clinker dry process plant scheduled for operation in 1979. Major equipment, being supplied by Fives-Cail Babcock, includes: 5.4 × 96m rotary kiln equipped with four-stage twin cyclone preheater; 5 × 16.25m, 230 tph raw mill; 4.6 × 15.25m, 140-tph finish mill.

• Les Ciments de Bizerte: Bizerte. Expansion via one dry process 700,000 mtpy kiln. Contractor: F. L. Smidth. Consulting engineer: Lafarge Conseils et Etudes. Start-up: 1978. Equipment, supplied by F. L. Smidth, includes: MPS mill; a 5.25 × 178m rotary kiln with two-stage cyclone preheater; two 44 × 13m Unidan mills, an electrofilter; and a Fluxo packer.

• Ciments Tunisiens: Planning 1 million mtpy dry process plant in the Tunis area, at Djebel Oust. Lafarge Conseils et Etudes will act as engineering consultant for the study and supervision of construction.

Uganda

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.098	0.088	0.090	—	0.45

• Uganda Cement Corp.: Hima (near Zaire border). Adding 600 tpd production line. Contract awarded to Humboldt Wedag. Dry process, using a preheater, 50 × 3.6m rotary kiln and a grate cooler.

West Africa (see Togo, Ghana, & Ivory Coast)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
—	—	—	—	1.5

• Les Ciments de l'Afrique de l'Ouest has been formed by the West African governments of Togo, Ghana, and the Ivory Coast to build a 1.2 million tpy cement plant near Tabligo, Togo. The Blue Circle Group (Great Britain) has the contract for the engineering services. Polysius is supplying major equipment, including two 2,100 tpd clinker kilns equipped with planetary coolers. Scheduled onstream in 1979.

Zaire

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.628	0.534	0.488	1.1	1.1

• Planning expansion of cement plant in Shaba.

Zambia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.452	0.460	0.480	—	0.7

• Planning extension of Zambian cement plant.

ASIA

Afghanistan

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.120	0.157	0.157	—	0.9

• In Kandahar region: New 1,600 mtpd plant scheduled for 1979 operation. Contract awarded to consortium consisting of Fuller Co., Fischbach-Moore International, and Oman Construction. Pyroprocessing system will include two preheater-equipped rotary kilns.

Bahrain

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
—	0.092	0.140	—	—

• Clinker grinding plant only.

Bangladesh

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.102	0.227	0.308	—	—

Burma

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.181	0.229	0.255	54	0.54

China, People's Republic of

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
46.9	49.1	51.5	54	—

• Hopewell Holdings Ltd. in Hong Kong has contracted to build a new cement plant in China, partly to export cement and partly to provide cement to the growing Chinese domestic market. Cost of the plant, to be built by an as yet unidentified Japanese contractor, is put at around $100 million.

• F. L. Smidth has received orders for 37 Symetro gears of various sizes for motor outputs ranging from 800 kW to 2000 kW. The gears, which are for the Chinese cement industry, will be supplied in 1979 and at the beginning of 1980.

Cyprus

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.611	1.026	1.074	1.2	1.2

Hong Kong

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.575	0.765	1.029	1.45	1.45

• Kaiser Cement Corp., Oakland, Calif., has announced the formation of a new company to construct and operate a $185 million cement plant in Hong Kong. The new firm, China Cement

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Quantities in million metric tons

Company (Hong Kong), Ltd., will be managed by Kaiser Cement under a long-term contract.

At the outset, it will be owned 40% by Kaiser Cement and 60% by a consortium headed by Cheung Kong (Holdings), Ltd., a large development company in Hong Kong. The consortium initially will be owned two-thirds by Cheung Kong and one-third by Kiu Yip Investment Corp., Ltd., a company controlled in Beijing (Peking). The cement plant will utilize pulverized fly ash from a new power plant as one of its raw materials. Bendy Engineering Co. will provide preliminary engineering. When completed, the dry process plant will include raw material unloading and handling, preblending, raw grinding, homogenizing, a preheater-precalciner type kiln, clinker storage and cement grinding with storage and shipping facilities. Project scheduled for completion in 1982.

India

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
16.205	18.635	19.064	19.6	26

- Coromandel Fertilizers Ltd.: New 1 million mtpy dry process (precalcining system) plant will be built in the Cudappah district of Andhra Pradesh (South India). Consulting engineering contract awarded to Holtec Engineering (Holderbank Management & Consulting Ltd.).
- Modi Rubber Ltd.: Holtec Engineers have prepared a report for a new 1 million mtpy cement plant to be located in the Raipur district of Madhya Pradesh in Central India.
- State Industrial Development Corp. of Kerala (South India): Holtec Engineers have been retained by the corporation for the engineering of a new 1,200 mtpd cement plant to be built at Walayar in the Palghat District.
- Narmada Cement Co.: Jafarabad. New plant scheduled for 1981 startup. Fuller Co. supplying following equipment: 15 ft. × 220 ft. rotary kiln; SF-141 flash calciner (3,000 mtpd); 12½ ft. × 45 ft. finish ball mill; two raw roller mills; coal roller mill; grate clinker cooler.
- Larsen & Toubro, Cement Machinery Div.: Constructing 3,200 mtpd dry process plant at Chandrapur, Maharashtra. The equipment will be based on the F. L. Smidth precalciner/kiln system. Scheduled onstream in 1982.
- Hetauda Cement Industries Ltd.: New 260,000 mtpy dry process plant to be built at Hetauda (west of Kathmandu), Nepal. Consulting engineers: Prospective Engineering Gestion.
- Birla Jute Manufacturing Co. Ltd.: Have placed an order with Larsen & Toubro and F. L. Smidth for an extension to their Patna plant. The new installation will comprise a 2,500 mtpd dry process production line with precalcining kiln, raw grinding department, raw meal homogenizing plant, kiln department, and coal grinding plant.
- Century Spring & Manufacturing Co. Ltd.: Larsen & Toubro supplying major equipment for a 2,400 mtpd dry process plant at Maihan Madhya Pradesh. Scheduled onstream: 1979.
- Cement Corp. of India Ltd.: Installing 600 tpd kiln with four-stage cyclone preheater and Unax cooler at Rajban, Himachal Pradesh (Northern Region). Supplier: Cement Machinery Div., Larsen & Toubro (Bombay) and F. L. Smidth. Scheduled onstream: 1979.
- Cement Corp. of India Ltd.: Installing three 1,200 tpd dry-process units at Neemuch, Akaltara and Yerrguntla Himachal Pradesh (Western Region). Supplier: Cement Machinery Div., Larsen & Toubro (Bombay). Scheduled onstream: 1979.
- J. K. Synthetics Ltd.: Expansion at Nimbahera, Rajasthan. Equipment suppliers: Larsen & Toubro (Bombay) with F. L. Smidth. Major equipment includes 1,200 tpd, 14½ ft. × 210 ft. rotary kiln with four-stage cyclone preheater and Unax planetary cooler; 14 ft. × 23 ft. raw mill; and 12½ ft. × 36 ft. finish mill. Scheduled onstream: 1979.
- Andhra Cement Co., Ltd.: New dry process 1,200 tpd plant at Nadikudi in the Guntur District of Andhra Pradesh. Consultants: Techno Craft Engineering.
- Tadpatri Cements Ltd.: New 400,000 tpy plant at Tadpatri. Consultants: Techno Craft Engineering Ltd.
- Raasi Cement Co. Ltd.: New 200,000 tpy cement plant at Wazeerabad in the Nalgonda District of Andhra Pradesh. Consultants: Techno Craft Engineering.

Indonesia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.085	1.806	2.678	4.3	6.4

- P. T. Semen Gresik: 3,200 mtpd expansion at Gresik Persero plant. Process engineering by Bendy Engineering Co.; design engineering by the H. K. Ferguson Co.; construction by Morrison-Knudsen International Co., Inc.; start-up and operating services by the H. K. Ferguson Co. and MKI, Inc. Equipment includes: two Polysius 4.6 × 74m-long rotary kilns with two 7.3m-diam. counterflow preheaters; three Allis-Chalmers 12½ ft. × 36 ft., 3,200 hp each, cement mills; one Kennedy Van Saun 11½ ft. diam. × 100 ft.-long rotary clay dryer rated at 80 tph; Kennedy Van Saun pneumatic conveying equipment and silo distribution and withdrawal systems; two Fuller Loesche roller mills, 135 mtph each; two Fuller grate clinker coolers, 1,800 mtpd each; Fuller Air-Merge blending system with 1,975 metric ton cement silo capacity; three Fuller materials coolers. Onstream in 1978.
- P. T. Semen Baturaja: 500,000 mtpy plant at Baturaja, South Sumatra, is scheduled for completion in 1981.
- P. T. Perkasa Indonesia Cement Enterprise (Indocement Group): Cibinong, West Java. Adding a 3,200 tpd dry process production line. Major equipment suppliers are KHD Humboldt Wedag and Centunion (Spain). Production will be based on the Pyroclon process, using a 70 × 4.6m rotary kiln and a Humboldt twin-type preheater with secondary firing. Scheduled operation: 1980. A fourth production line with a 3,200 tpd output has been commissioned.
- P. T. Semen Tonasa: New 500,000 tpy plant projected for Biringere, Sulawesi. Scheduled operation: 1979. Engineering consultants: Dames & Moore. Major processing equipment, supplied

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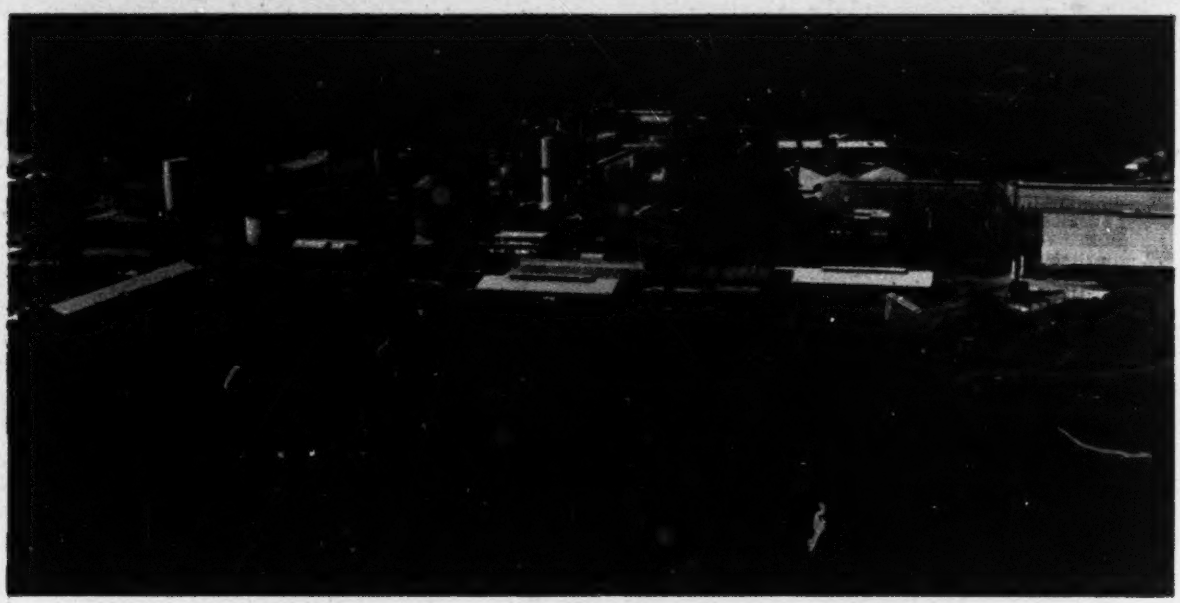
Quantities in million metric tons



INDONESIA: P.T. Perkasa Indonesia Cement Enterprises—Cibinong, West Java. Adding a 3,200 mtpd dry process product line. *(Courtesy: Humboldt Wedag)*

by F. L. Smidth, includes: 4.75 × 75m rotary kiln with four-stage suspension preheater; 4150-hp Unidan finish grinding mill; FLS cement cooler.

- P. T. Semen Padang: New 2,000 tpd plant being built at Indarung, Western Sumatra. Major equipment, furnished by F. L. Smidth, includes: one 2,000 tpd, 16½ ft. × 263 ft. rotary kiln with four-stage cyclone preheater and Unax planetary cooler; 16 ft. × 28 ft. raw mill; 14½ ft. × 39 ft. finish mill. Bendy Engineering Co. and H. K. Ferguson International Co. were consulting engineers. H. K. Ferguson is technical consultant for construction and start-up. Scheduled onstream: 1979. Extensions planned to expand capacity with another 600,000 tpy by 1981.

Iran

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
5.000	5.400	7.000	14.3	16.8

Because of the political situation in Iran, the status of cement plant construction activity is not known. The latest available data appeared in the January 1979 issue of Pit & Quarry.

Iraq

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
2.200	2.385	2.800	6.7	7

- State Organization of Industrial Design & Construction: Awarded an order to construct a 1 million mtpy cement plant to Kawasaki Heavy Industries Ltd. and Marubeni Corp. The plant will be erected in Hit City (180 km west of Baghdad), using the Kawasaki suspension preheater system.
- Iraqui Cement Public Co.: A four kiln cement plant with a capacity of 2.3 million tpy at Kufa (100 miles south of Baghdad) was commissioned in 1978. The Government of Iraq awarded the contract for the installation to F. L. Smidth & Co.
- Public Company for Building Materials: Badoosh. Expansion via two 1,500 mtpd Polysius Gepol kilns. Onstream in 1978.

Israel

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
2.189	1.999	1.852	2	2.3

Japan (includes Ryukyu Islands)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
65.191	68.198	75.176	84.4	—

- Mitsui Cement Co.: Tagawa Works expansion via IHI SF precalcining system. Start-up of 5.0 × 75m kiln scheduled for 1979.
- Osaka Cement Co. Ltd.: Ibuki Works. Expansion via IHI SF precalcining system. Start-up of 2,700 mtpd, 3.8 × 79m kiln scheduled for 1979.
- Sumitomo Cement Co. Ltd.: Hachinohe Works expansion via IHI SF precalcining system. A 4.7 × 75m kiln start-up scheduled for 1979.
- Tokuyama Soda Co.: Nanyo Works expansion via addition of IHI SF precalcining system. A 5.7 × 110m kiln started up in 1978.
- Ube Kosan Co.: Kanda Works expansion via IHI SF precalcining system. Start-up of a 5.4/5.5 × 100m kiln scheduled for 1979.

METRIC CONVERSION FACTORS

feet (ft.) x 0.3048 → meters (m.)
miles x 1.6093 → kilometers (km.)
cubic feet (cu. ft.) x 0.0283 → cubic meters (cu. m.)
cubic yards (cu. yds.) x 0.7646 → cubic meters (cu. m.)
short tons (s.t.) x 0.9072 → metric tons (m.t.)
horsepower, U.S. (h.p.) x 1.01387 → metric horsepower (m.h.p.)
degrees Centigrade → 5/9 (degrees Fahrenheit — 32)

JAPAN: Osaka Cement Co. Ltd. Ibuki works. Precalcining system expansion adds 2,700 mtpd; 1979 startup. *(Courtesy: IHI Inc.)*

Jordan

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.572	0.533	0.501	1.2	1.2

- Kaiser Engineers, Inc. (subsidiary of Raymond International, Inc.) will provide consulting engineering and construction management services for a 1 million mtpy cement plant to be built at Rashadiya, midway between Amman and Aqaba. Scheduled completion: 1982.
- Jordan Cement Factories Co. Ltd.: Fuheis. Fifth kiln onstream in 1979 boosted production to 1.1 million mtpy. The kiln is a Polysius Dopol preheater unit. A sixth kiln is scheduled for operation in 1982.
- The board of directors of the joint Jordanian-Syrian Industrial Co. has decided to establish a plant for the production of white cement in Jordan.

Kampuchea (Cambodia)

Production and capacity data not available.

Quantities in million metric tons

Korea (North) Democratic Peoples Republic

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
7.000	7.500	7.700	10	10.5

- North Korean Cement Industry: At Sunchon, a new plant with three production lines of 3,300 tpd each was placed in operation in 1978. F. L. Smidth supplied the major cement manufacturing equipment.

Korea (South), Republic of

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
10.129	11.873	14.418	15.1	20.3

- Union Corporation, Seoul, has entered into a contract with F. L. Smidth covering the supply of machinery and electrical equipment for a new 300 tpd white cement plant to be erected at a site 200 km southwest of Seoul. The order comprises a 3.45 × 60m rotary kiln with a two-stage cyclone preheater, Unax cooler and heat exchanger, a Tirax raw mill, and a Unidan cement mill, both with a Symetro gear.
- Ssang Yong Cement Industrial Co. Ltd. has awarded Polysius Corp. a contract for expansion of its Tonghae plant with a 8,400 mtpd installation. Major equipment will include: two 4.8m-dia. × 17m-long, 5,200-hp center discharge raw mills, each rated at 300 mtph, and equipped with two 8m-dia. air separators; two Polysius Prepol cyclone preheaters with precalcining, rated at 4,200 mtpd each; two 5.2m-dia. × 70/102m-long rotary kilns with planetary coolers; coal-grinding plant consisting of a 4,100-hp, 4.8m-dia. × 15m-long double rotator mill, equipped with two 8m-dia. air separators; homogenizing system; two 4.8-dia. × 16.5m-long, 6,800-hp cement mills, rated at 150 mtph, and equipped with two 6.5m-dia. air separators; process control equipment.
- Sung Shin Chemical Co. Ltd.—expanding Tanyang plant. Polysius is supplying major equipment, including: preheater kiln system rated for 3,000 mtpd with 5.0/4.8m × 60/89.5, kiln with planetary cooler; 5,200-hp raw grinding mill, 4.8m × 17m, rated for 290 mtph; three cement mills, each 3,500 hp, 4.0 × 13.5m, rated for 75 mtph at 3,200 Blaine.
- Tong Yang Cement (Seoul) has started an expansion program for its Sam Chok plant. Fuller Co. is supplying equipment, including: 48 × 60 in. jaw crusher; 42 in. gyratory crusher; two 10 ft. × 70 ft. rotary dryers; two 13 ft. × 45 ft. raw mills; two 16 ft × 245 ft. rotary kilns with four-stage twin preheaters; clinker coolers; three 13 ft. × 45 ft. finish mills; plus blending, conveying and dust collecting equipment.

Kuwait

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.285	0.352	0.380	1.35	1.35

- Kuwait Cement Co.: Shuaiba. New 75,000 mtpy white cement plant scheduled onstream in 1979. Major equipment furnished by KHD Humboldt Wedag.

Lebanon

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.440	0.506	1.600	1.7	2.4

- Cimenterie National S.A.L.: Chekka. Polysius Dopol kiln, rated for 1,500 mtpd, onstream in 1978.
- Societe Libanaise des Ciments Blancs (S.L.C.B.) Chekka Works: Dry process extension for white cement of 100,000 mtpy. Complete design and engineering: Lafarge Conseils et Etudes (France). Start-up scheduled in 1979.

Malaysia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.426	1.586	1.740	2.4	2.5

- Associated Pan Malaysia Cement Sdn Bhd: New 1.2 million mtpy plant to be built on site of existing Rawang cement factory. Machinery will be supplied and erected by Ishikawajima Heavy Industries. Malayan Cement Berhad, a Blue Circle Industries subsidiary, has a 50% equity in the project.

Mongolia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.165	0.144	0.150	—	—

Nepal

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.030	0.036	0.040	0.050	0.050

- Onoda Engineering and Construction Co. has been awarded a contract for construction of a 250,000 mtpy cement plant in Nepal, with completion scheduled for 1981.

Oman, Sultanate of

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.250	0.300	0.392	—	—

- Oman Cement Co. is setting up a 1 million mtpy plant in the Muscat region. Production is scheduled to start in 1982.

Pakistan

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
3.225	2.980	3.175	3.8	4.1

- Mustehkam Cement Ltd.: Adding a 300,000 tpy dry process, one kiln unit. KHD Humboldt Wedag Industrieanlagen is supplying the major equipment. Scheduled onstream in 1979.
- Javedan Cement Ltd. (State Cement Corp. of Pakistan) Javedan. Adding a 300,000 tpy dry process, one kiln unit. Fuller Co. supplying major equipment, including: 13½ ft. × 190 ft. rotary kiln with four-stage preheater; 12 ft. × 26 ft. raw mill; 12 ft. × 37 ft. finish mill; clinker cooler; pneumatic conveyor; dust collectors; and auxiliary equipment. Start-up expected: 1979.
- Pak-Iran Cement: New 300,000 tpy plant scheduled for 1980 operation in Darwaza (Baluchistan).
- In Kohat (NWFP): New 300,000 tpy plant scheduled for 1980 operation.
- Early in 1979 the Government of Pakistan engaged the joint venture of Bendy Engineering Co., USA, and Industrial & Cement Engineering, Ltd., Pakistan, to prepare a feasibility study for the establishment of a new cement plant near Nizampur in Pakistan.

Philippines

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
4.351	4.229	4.112	6.7	6.7

Qatar

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.164	0.179	0.176	0.3	0.3

Saudi Arabia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.250	1.300	1.350	3.2	3.8

- Buraidah Cement Co. (Qassim) will build a 2,000 tpd plant near Buraidah (400 km northwest of Riyadh). Equipment will be furnished by KHD Humboldt Wedag. Operation is scheduled for 1980. Binladen-Kaiser, a Saudi Arabian affiliate of Kaiser Engineers, Inc., is consulting engineer for the project.
- Saudi-Bahraini Cement Co. has awarded a contract to Ishikawajima-Harima Heavy Industries Co., Ltd. (IHI), Japan, for construction of a 6,000 mtpd plant at Abgeig (about 100 km west of Damman). Operation is scheduled for 1981. Four 1,500 mtpd kilns will be installed. Holderbank Management & Consulting Ltd. is acting as consultant for this project.
- Saudi Cement Co. expanded its Hoffuf cement works in eastern Saudi Arabia with a new 1 million mtpy cement installation onstream in 1978. The equipment, supplied by Polysius, included two 1,500 mtpd dry kilns.
- Saudi Kuwaiti Cement Manufacturing Co. building new 7,000 tpd plant on the Arabian Gulf Coast. Prospective Engineering Gestion (Switzerland) is consulting engineer for the project. Plant is scheduled to be operational in 1983.
- Southern Province Cement Co.: New 5,000 mtpd plant to be erected at plant site 35 km east of the Red Sea, 60 km southeast of the city of Gizan, and 11 km from the Yemen border. The joint-venture turnkey contract was awarded to the Fuller Co. and Hyundai International, Inc. (Korea). Consulting firm was Basse Sambre-E.R.I., S.A. The plant has been designed with two cement manufacturing systems side-by-side, each with a capacity of 2,500 mtpd. Major equipment incorporated in the process includes two 42 in. gyratory crushers, two 6,000-hp, 15 ft. × 42 ft.-long raw ball mills, a blending and kiln feed system, two 14 ft. 6 in. × 210 ft.-long kilns, two preheaters with flash calciners, two clinker coolers, as well as two 7,000-hp, 15 ft. × 48 ft.-long finish ball mills. Scheduled start-up: 1981.
- Yamama Saudi Cement Co. Ltd.: Riyadh. Expansion via two 1,500 mtpd dry process Polysius kilns, onstream in 1978.
- Yanbu Cement Co. Ltd.—new plant to be built near Ra's Baridi (at the Red Sea). Contract for construction was issued to KHD Industrieanlagen Humboldt Wedag AG (W. Germany). Plant will have two production lines with daily output of 3,000 tons of clinker, and is scheduled to go on stream in 1980.
- Yanbu Cement Co. and Arabian Cement Co., both of Jidda, have awarded a consulting job for planning, construction, and equipment installation for two new cement plants to Naigai Consulting Co., subsidiary of Onoda Cement Co., Japan. The mills will be built near Jidda and have a production capacity of 1 million tpy. KHD Industrieanlagen Humboldt Wedag is the major equipment supplier.
- Jizan Cement Co.: Two 2,500 mtpd precalciner kilns under construction in Southern Province. Major equipment supplier is Fuller Hyundai, as a joint venture.

Singapore

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.320	1.500	1.415	2.6	2.6

Sri Lanka

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.394	0.422	0.400	0.7	0.7

Syria (Syrian Arab Republic)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.994	1.110	1.395	1.6	2

- Adra Cement Co.: New plant at Adra with two production lines, each with 1,000 tpd dry process kiln. Scheduled onstream in 1979. Plant and equipment supplied by ZAB/SKET of the German Democratic Republic.
- Tartous Cement Co.: Two 600 tpd dry process kilns to come onstream at Tartous in 1980.

Taiwan

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
6.795	8.757	10.334	13	14

- Asia Cement Corp.: Hualien. Adding a 3,000 tpd production line, using KHD Humboldt Wedag Pyroclon process (short rotary kiln and twin-type preheater with secondary firing system). Scheduled onstream in 1980.
- Chia Hsin Cement Corp.: Kangshan plant. Expansion expected to start up in 1980. Fuller Co. supplying following equipment: one 15 ft. × 220 ft. rotary kiln; one preheater; one flash calciner; one Fuller-Loesche roller mill; one clinker grate cooler; blending system.

UNITED ARAB EMIRATES: **Union Cement Co. Ltd. Third kiln will add 1,500 tpy in expansion program at Ras al Khaimah** *(Courtesy: IHI Inc.)*

- Hsin-Hsin Cement Co. (Taipei) has awarded a contract to Polysius Corp. for a 2,220 mtpd cement plant. Major equipment will include: 3,200-hp center discharge raw mill, 4.4m-dia. × 15m-long, with two 6m-dia. air separators; cyclone preheater with precalcining system; 4m-dia. × 65m-long rotary kiln; traveling grate cooler; 5,200-hp cement mill, 4.4m-dia. × 16m-long, rated at 120 mtph, with two 6m-dia. air separators; homogenizing system; central control system; pneumatic equipment; bagging plant. Scheduled to be onstream in 1979.
- Taiwan Cement Co. has signed a contract with F. L. Smidth for an extension of the Suao plant. The order covers a 3,200 tpd rotary kiln with a four stage preheater and a precalciner, a Folax cooler, and a coal mill. Scheduled onstream: 1980.
- China Rebar Co. Ltd.: Tung Shan. Allis-Chalmers providing equipment and engineering services for conversion of MIAG-type suspension preheater to precalcining. Capacity will be increased from 2,400 to 3,000 mtpd. Start-up scheduled for 1980.

Thailand

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
3.990	4.458	5.000	4.5	4.5

- Siam Cement Co. Ltd.: Adding 4,000 tpd production line at Ta Luang (about 140 km from Bangkok). Equipment contract awarded to F. L. Smidth. The kiln will be of the dry process type with four stage preheater and separate precalciner. Other equipment includes: 3,050 kW raw mill, homogenizing plant, Folax cooler, and electrostatic precipitator.
- The Siam Cement Co. Ltd. is expanding another plant at Tabkwang, Saraburi (approx. 130 km from Bangkok), by a new 4,000 tpd production line. Main machinery, to be supplied by F. L. Smidth, includes a 4.75 × 75 m rotary kiln with four stage cyclone preheater and separate precalciner, a Folax cooler, two raw mills, and two cement mills with Symetro gear.
- Thai Lanna Cement Co.: Planning 2,300 tpd plant to go into operation by 1981 in the Lampang area.

United Arab Emirates (Abu Dhabi, Dubai, Sharja, Ajman, Fujaira, Umm al Quaiwan, Ras al Khaima)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.047	0.305	0.400	1.3	1.3

- Gulf Cement Co.: Ras al Khaimah. New 1 million mtpy cement plant to be built by UBE Industries of Japan. The W. S. Atkins Group will act as consultants for design and on-site supervision of construction. The project will utilize the UBE flash calciner system. Scheduled onstream in 1981.
- Union Cement Co., Ltd.: Ras al Khaimah. Third kiln of 1,500 tpd capacity is due onstream in 1980. Plant will incorporate Ishikawajima-Harima Heavy Industries Co., Inc. SF-type burning system (flash furnace/four-stage cyclone preheater/3.6m × 52m rotary kiln).
- National Cement Co. Ltd.: Dubai. New 1,500 tpd plant onstream in 1978. The equipment for this wet process plant was furnished by Costain/F. L. Smidth; Holderbank Management & Consulting Co. Ltd. was consultant.
- Al-Ain Cement Factory: Al-Ain, Abu Dhabi. New 1,800 mtpd plant will use the IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.) SF-type cement sintering system. Holderbank Management & Consulting Ltd. will act as consultant for planning and implementation of the project. Operation is scheduled for 1981.
- Emirate of Fujairah has awarded a construction contract to Voest-Alpine for a 1,600 tpd dry process plant. Kaiser Engineers, Inc. are the consultants on the project.

Vietnam

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.685	0.710	0.820	0.9	2.8

- Technoimport has contracted with F. L. Smidth to supply equipment for a new 3,100 tpd plant at Hoang Thach near Dong Trieu. Equipment includes a 775 tph crusher, blending and storage equipment for 43,000 tons of raw materials, an 18½ ft. × 23 ft., 3900-kW raw mill, an 18 ft. × 293 ft. kiln with four stage twin preheaters and planetary cooler; a 6,500-kW finish mill, 17 ft. × 46 ft.; and equipment for dispatch of cement in bulk and sacks. The system further includes equipment for advanced, computerized control systems.
- Cimenterie de Ha Tien, Kien-Luong plant: Technoimport has awarded a contract to French subsidiary of Polysius AG for addition of a Dopol kiln, complete with a precalcining system and auxiliary equipment, to the plant. The kiln will have a capacity of 1 million tpy and is scheduled for 1980 operation. Major equipment includes: one precalcining system rated for 3,000 mtpd with 4.8 × 60/89.5m kiln with planetary coolers; one 4,500-hp air-swept raw mill, 5.2 × 11m, rated for 240 mtph; two 4,200-hp cement mills, each 4.2 × 14m, rated for 90 mtph.

Yemen

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.080	0.080	0.100	—	—

- Cement plant is to be constructed at Bajil, near Hodeida, with a capacity of 200,000 tpy.

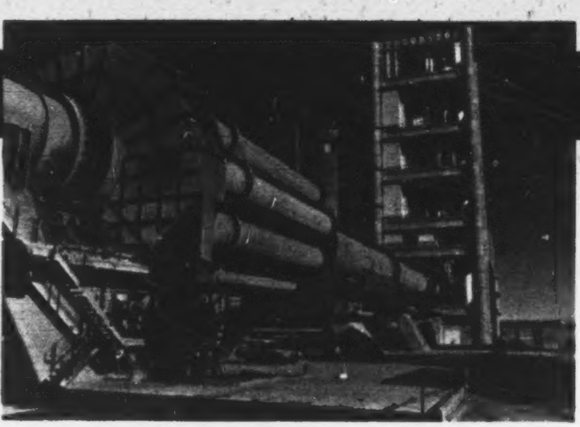
OCEANIA

Australia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
5.017	5.062	5.023	—	—

• Goliath Portland Cement Co., Ltd.: Railton, Tasmania plant expansion using Humboldt Wedag Pyroclon precalcination preheater system. Will double plant's production to 1 million mtpy. Scheduled for 1981 operation.

• Blue Circle Southern Cement Ltd.: Berrima plant expanded. F. L. Smidth, via licensee Vickers Ruwolt of Melbourne, was the supplier of major equipment, including: a 16½ ft. × 280 ft. rotary kiln, rated at 2,300 tpd, with four-stage cyclone preheater and Unax planetary cooler; and an 1,800 kW MPS raw mill. Start-up scheduled for 1979.



Blue Circle Cement Ltd. Berrima. Expansion rated at 2,300 mtpd scheduled for 1979 operation. *(Courtesy: F.L. Smidth & Co.*

Fiji Islands

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.072	0.069	0.070	0.11	0.11

New Caledonia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.058	0.054	0.041	0.15	0.15

New Zealand

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.074	1.000	0.911	1.3	1.3

EUROPE

Albania

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.650	0.700	0.750	0.9	1

Austria

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
5.507	5.758	5.904	5.611	6.5

• Peggauer Zementwerke: Klagenfurt. Added Polysius Lepol kiln system with 3.8 × 3.6 × 54m rotary kiln rated at 800 mtpd. Scheduled onstream in 1978.

Belgium

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
6.884	7.504	7.764	7.576	—

Bulgaria

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
4.358	4.361	4.666	5.1	5.3

Czechoslovakia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
9.300	9.552	9.750	11.1	11.8

• Czechoslovak Cement Industry: Prachovice. Adding a 1.2 million tpy plant. Scheduled to go into operation in 1979.

Denmark

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
2.062	2.270	2.151	2.537	2.7

Quantities in million metric tons

Finland

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
2.063	1.825	1.736	1.718	2.7

France

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
30.657	30.567	30.352	30.335	32

• Ciments Francais: Erected 1,800 mtpd preheater kiln system at Bussac. Polysius Corp. supplied major equipment, including Dopol cyclone-type preheater; 4.6m × 70/90.3m long rotary kiln with planetary coolers; 4.2m dia. × 14.5m-long, 3300-hp center discharge raw mill; two 6.5m-dia. air separators. Onstream 1978.

• Ciments Lafarge France, Haubourdin Works: (500,000 mtpy)—Conversion from long, wet process kiln to semi-dry kiln with pressure filters to produce filter cake for the preheating Polysius Lepol grate kiln. Complete design and engineering: Lafarge Conseils et Etudes. Start-up scheduled: 1978.

Germany—East (German Democratic Republic)

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
10.653	11.345	12.103	12.5	13

Germany—West (Federal Republic of Germany)

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
32.975	33.832	31.871	32.993	45

• Dyckerhoff Zementwerke AG: Modifying clinker production line at Fortuna plant at Geseke by installing a KHD Humboldt Wedag Pyroclon preheater system to increase production from 800 to 1,500 mtpd.

• Dyckerhoff Zementwerke AG: Lengerich plant. Installing Polysius Prepol preheater with precalciner/kiln, rated at 1,500 mtpd.

Greece

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
7.770	8.592	10.467	11.333	12

• Halyps Cement Co. S.A.: Aspropyrgos. Adding one 1,500 tpd dry process kiln. Scheduled onstream: 1979.

• Titan Cement Co. S.A.: Kamari plant extension with a 3,000 tpd cement unit. F. L. Smidth supplying main machinery, including: 5 × 80m, 3,000 tpd rotary kiln equipped with a four-stage cyclone preheater and a Unax planetary cooler, 3,310 kW raw mill with air separator, 4.6 × 14m, 4,500 kW finish mill with air separator.

- Heracles General Cement Co. S.A.: Planning 1.5 million mtpy plant at Milaki in Euboea to replace Piraeus plant.
- Heracles General Cement Co., S.A.: Volos cement plant. Converting production lines four and five to the KHD Humboldt Wedag Pyroclon process. Clinker production line four, equipped with a single-line Humboldt preheater, increased from 1,700 to 2,100 mtpd; that of kiln line five, with a two-line preheater, increased fro 2,300 to 3,000 mtpd.

Hungary

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
3.756	4.298	4.621	4.8	5.6

Iceland

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
0.164	0.144	0.139	0.133	—

Ireland

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
1.564	1.617	1.581	1.795	2.1

- Cement Ltd.—expansion at Platin plant added 1 million tpy capacity. Major equipment, supplied by F. L. Smidth, included an 18 ft. × 290 ft. rotary kiln, rated at 3,000 tpd and equipped with twin four-stage suspension preheaters and planetary cooler. Onstream in 1978.

Italy

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
34.625	36.624	38.439	38.493	39.7

Luxembourg

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
0.334	0.299	0.619	0.935	0.96

Netherlands

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
3.703	3.476	3.894	3.918	5

Norway

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
2.716	2.681	2.420	2.339	—

Poland

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
18.540	19.908	21.298	21.7	26.4

- Union of Cement Industry: Ozarow Cement Plant—New plant with two dry process kilns at 3,500 tpd each. Onstream: 1978. F. L. Smidth supplied main machinery, including two four-stage preheater kilns.
- Union of Cement Industry: Przyjazn—New plant with four dry process kilns of 1,600 tpd each.
- Union of Cement Industry: Strzeke Opolskie—New plant with four dry process kilns at 1,200 tpd each.

Portugal

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
3.441	3.749	4.413	5.163	6.1

- CIMPOR—Cimentos de Portugal E.P.: Expanding production line at the Souselas works (in the north of Coimbra). Major equipment to be supplied by Polysius. Will double capacity of plant to 2 million mtpy. Scheduled to go into operation in 1980.

Romania

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
11.520	12.548	13.700	14.2	17.5

Spain (includes Canary Islands)

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
24.404	25.961	29.422	32.064	35.5

- Hornos Ibericos S.A.: Contract awarded to KHD Humboldt Wedag to set up a cement plant in cooperation with Centunion Corp. (Madrid) near Carboneras, about 50 km east of Almeria. Capacity of unit mill be 3,000 tpd in a dry process rotary kiln with a Pyroclon preheater. Scheduled onstream in 1980.
- Cementos Portland S.A.: Olazagutia. Converting to Fuller SF process via an 1,800 mtpd flash calciner plus cooler expansion.

Sweden

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
3.346	2.819	2.578	2.370	3.8

- Cementa AB: Adding 4,700 mtpd production equipment to its Slite plant (on Gotland Island). Polysius Corp. is supplying major equipment, including: 2,400 hp double roller mill rated at 400 mtph; 4.6/5.2m-dia. × 80m-long rotary kiln with precalcining and cyclone preheater unit; two 6,000 hp, 4.8m × 15.5m cement mills, each rated at 120 mtph; homogenizing system. Start-up was scheduled for 1979.

Switzerland

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
3.722	3.546	3.649	3.698	6.2

Turkey

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
10.891	12.421	13.869	15.409	19

- Aslan Cimento A.S.: Darica plant expansion. Incorporates a Polysius Dopol kiln rated for 3,000 mtpd. Was scheduled onstream in 1978.
- Canakkale Cimento Sanayii A.S., Istanbul, awarded contract to Fuller Co. to supply the process equipment and engineering for a 2,500 mtpd cement plant. Completion is scheduled for 1979. Contract included 16½ ft. × 255 ft. rotary kiln and four-stage preheater, Fuller-Loesche roller mill, two finish mills, clinker cooler, kiln feed system, and blending system.
- The Aslan, Turkey plant of Aslan ve Eskihisar Muttahit Cimento ve su Kirechi Fabrikalari A.S. planned expansion of capacity from 480,000 mtpy to 1 million mtpy.
- A 500,000 mtpy cement mill will be constructed in Yozgat, Central Anatolia, Turkey. The mill was established by Yozgat Isci Virligi Insaat Malzemeri ve Sanayi, a joint stock company formed in 1973. Lignite mined in Turkey will be used as fuel. Was scheduled onstream in 1978.
- Further expansion of cement production is planned in Turkey. The Cisan (Turkiye Cimento Sanayee T.A.S.), the Turkish national cement enterprise, has placed an order with the KHD Humboldt Wedag for the erection of seven cement plants. All plants will be dry process systems using Humboldt preheaters. The plants will be built according to one concept, retaining the same plant dimensions. Their clinker production will average about 1,750 mtpd with slight variations due to the different altitude levels of the plants and different raw materials deposits.

United Kingdom

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
17.575	16.357	16.054	16.564	19

- Ketton Portland Cement Co. Ltd.: Ketton. Expansion added 220,000 mtpy in 1978.
- Rugby Portland Cement Co. Ltd.: Rochester. Adding a 5.6 × 44m Polysius Lepol grate coupled with a 5.5 × 4.75 × 86m F. L. Smidth rotary kiln, with

Unax planetary coolers to produce a rated output of 2,200 mtpd of clinker. Semi-wet process to be used, utilizing pressure filters and sieve kneaders. Operation scheduled for 1980.

U.S.S.R.

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
122.040	123.900	127.000	129.3	140

Yugoslavia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
7.065	7.617	8.185	10.7	10.9

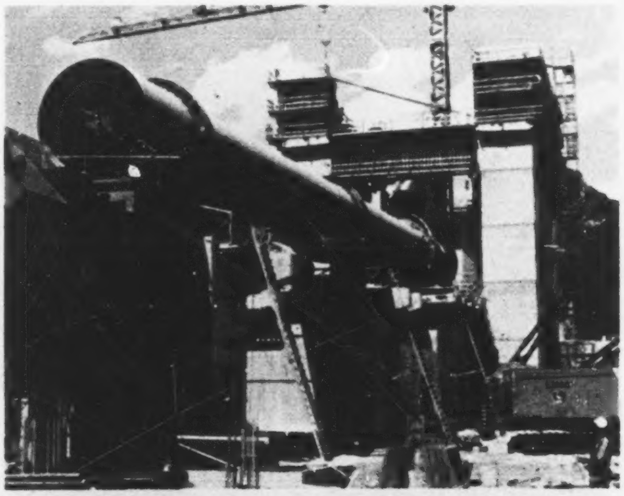
- Dalmacija Cement: Expanding Paitizan plant with 3,200 mtpd addition. Polysius Corp. furnishing major equipment, including: 3750 hp, 4.6m-dia. × 15.5m-long, center-discharge raw mill, equipped with two 6.5m-dia. air separators; 4.6m × 70m rotary kiln equipped with precalcining preheater; two 5400 hp, 4.4m-dia. × 16m-long cement mills, each rated at 100 mtph. Was scheduled onstream: 1978.
- Fabrika Cementa Novi Popovac: Expanding Popovac plant with a 2,000 tpd addition. Major equipment being supplied by F. L. Smidth and Pragoinvest includes: 16½ ft. × 263 ft. rotary kiln, rated at 2,000 tpd, equipped with four-stage cyclone preheater and Unax planetary cooler; 16 ft. × 27 ft., 2800-kw raw mill; 16 ft. × 46 ft., 5160-kw finish mill. Scheduled onstream: 1980.
- Tvornica Cementa Nasice: At Nasice. New 450,000 tpy dry process kiln. Was scheduled onstream: 1978.

NORTH AMERICA

Canada

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
9.741	9.898	9.933	14.5	15

- Canada Cement Lafarge Ltd.: Expanding plant at Exshaw, Alberta, to add 600,000 tpy. Equipment includes: F. Smidth gas-fired 3.95 × 56 m kiln, rated at 1,950 mtpd and equipped with a four-stage preheater with precalciner; Fuller 3.96 × 12.62 m, 3,700 hp, two-compartment raw mill; F. L. Smidth 4.60 × 14.02 m, 6,000 hp finish mill; Fuller clinker cooler; Wheelabrator electrostatic precipitator. Fuller-Kinyon conveying equipment. Operation is scheduled for 1980. Lafarge Consultants Ltd. are the engineering consultants for the expansion.
- Ciment Quebec, Inc.: St. Basile de Portneuf, Quebec. Plant expansion will replace existing 1,100 tpd wet process plant with a Fuller SF system rated at 2,000 tpd. Fuller Co. is furnishing major equipment, including: four-stage preheater with flash calciner; cooler; Fuller-Loesche airswept roller mill; blending equipment; Airslide conveying equipment; Fuller-Kinyon pumps; and dust collectors. Scheduled onstream in 1981.
- Federal White Cement Ltd.: Woodstock, Ontario. New 100,000 tpy white cement plant onstream in 1979. Lafarge Consultants Ltd. handled design, engineering, project management, site supervision, training of personnel, and start-up assistance.
- Inland Cement Industries Ltd. (Genstar Ltd. subsidiary): New 1 million tpy plant onstream in 1978 on Tilbury Island (near Vancouver, Delta, B.C.). Polysius Corp. supplied major equipment, including a 3,220 mtpd rotary kiln with a four-stage preheater and planetary cooler. Reid Crowther Bendy International provided the engineering design.
- Inland Cement Industries Ltd. (Genstar Ltd. subsidiary): Edmonton, Alberta. Plant expansion expected to start up in 1980. Equipment, furnished by Fuller Co., includes: four-stage preheater with flash calciner; 13½ ft. × 190 ft. rotary kiln; clinker cooler; blending equipment; Airslide conveyors; Fuller-Kinyon conveying equipment. Technical



CANADA: Canada Cement Lafarge Ltd. —Exshaw, Alberta. New 600,000 tpy expansion due onstream in 1980 *(Courtesy: Lafarge Consultants Ltd.)*

CANADA: Federal White Cement Ltd. Woodstock, Ontario. New 100,000 mtpy white cement plant placed onstream in 1979 *(Courtesy: Lafarge Consultants Ltd.)*

Quantities in million metric tons

and engineering services provided by Blue Circle Industries Ltd.

- St. Marys Cement Co.: Plant expansion at St. Marys, Ont., onstream in 1978. Equipment added includes: F. L. Smidth 2,000 mtpd rotary kiln with four-stage suspension preheater and planetary cooler; 15 ft. 6 in.-diam. Aerofall autogenous mill for clay drying. Allis-Chalmers roller mill. Reid Crowther Bendy International provided the engineering design.

- St. Lawrence Cement Co.: Mississauga, Ontario. Expanding via a Fuller SF flash calciner to increase production from 3,000 to 4,500 mtpd. Adding cooler section and new kiln drive.

United States of America

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
61.486	65.248	70.626	76.068	74.6

U.S. developments are covered in a separate article in this issue.

CENTRAL AMERICA

Bahamas

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.450	0.350	0.200	—	—

Barbados

- Governments of Barbados and Guyana have signed a contract with Holderbank Consulting Ltd. (Canada) for engineering and project management of plant to be built on Barbados island. The plant is rated at 250,000 tpy and is scheduled for operation in 1980. Sixty percent of the clinker will be ground into cement in the Barbados plant; the other portion will be shipped to Guyana for grinding. In recent years, Barbados has imported 30,000-70,000 tpy of cement.

Costa Rica

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.298	0.362	0.400	0.6	1

- Corporacion Costarricense de Desarrollo: Building a new cement plant at Golfo de Nicoya (near Puntarenas). Allis-Chalmers will have process, equipment and engineering services responsibilities for the 1,300 mtpd dry process plant. Equipment will be supplied from the U.S. and Spain. The contract includes an Allis-Chalmers roller mill with 1,750 hp drive motor; suspension preheater; 14 ft. × 197 ft. rotary kiln; 8 ft. × 22 ft. inclined/10 ft. × 41 ft. horizontal stoker cooler; 13 ft. × 42 ft. finish grinding Compeb mill with a 4,000-hp motor. Scheduled onstream in 1980.

- Cementos Calhidra S.A.: New plant at San Jose will have capacity of 400 tpd, operating with dry process system, using a preheater. Kiln is a 3.4 × 40.5m unit. Equipment supplied by Bühler-Miag (West Germany); engineering design by Ateinsa (Spain). Was due onstream in 1978.

Cuba

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
2.063	2.501	2.656	—	—

- Rene Arcay cement works: Mariel. Expansion, scheduled for 1978 operation, was to double capacity to 4,400 tpd. Humboldt-Wedag has furnished a two-shaft hammer crusher rated at 900 tph limestone. Engineering was provided by KHD Industrieanlagen AG in cooperation with Centunion (Madrid). In addition, a ship-loading installation is being built.

Dominican Republic

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.650	0.842	0.868	1.5	1.5

El Salvador

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.340	0.322	0.334	0.9	0.9

- Cemento de El Salvador S.A.: Dry process system expansion at El Ronco, Metapan plant onstream in 1979. Major equipment for this 1,000 mtpd addition, furnished by Allis-Chalmers, includes: 13½ ft. × 209 ft./273 ft. rotary kiln; 177 ft. high, four-stage preheater; satellite cooler consisting of nine 5½ ft. × 50 ft. tubes; 13 ft. × 22 ft. diaphragm ball mill; 12 ft. × 36 ft. Compeb-type finish mill.

- Cemento Maya S.A., Metapan Works, San Salvador: New plant with rated capacity of 800 tpd. Installed 3.6 × 52m rotary kiln equipped with a preheater. Major equipment furnished by Bühler-Miag; Ateinsa (Spain) provided engineering design. Was onstream in 1978.

Guatemala

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.369	0.445	0.489	0.5	0.8

- Cementos Progreso S.A.: Expanding San Miguel plant with a 1,600 mtpd clinker production line. Start-up was scheduled for 1979. F. L. Smidth is supplying the major equipment, including: 4.55m-dia. × 68/90m-long kiln; four-stage suspension preheater; 165 mtph raw mill; 85 mtph raw mill; 10 planetary cooler tubes; electrostatic precipitator; storage, material handling and shipping equipment. Bendy Engineering Co. performed engineering work.

Guadeloupe

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.146	0.131	0.133	—	—

Honduras

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.298	0.254	0.250	0.45	0.45

- Industria Cementera Hondurena, S.A.: Piedras Azules (north central Honduras). New plant under construction in 1979 for production of 1,200 metric tons per day of clinker plus more than 500,000 mtpy of portland and pozzolanic cement.

- Cementos de Honduras, S.A.: Rio Bajao. F. L. Smidth is furnishing the following equipment for a plant extension: Prehomogenizing section, Duodan raw mill, and a four-stage preheater/calciner Unax kiln rated at 2,000 tpd.

Haiti

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.144	0.246	0.257	0.3	0.3

Jamaica

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.407	0.365	0.333	0.4	0.8

Quantities in million metric tons

• Caribbean Cement Co. Ltd.: Expanding its Kingston plant with a 1,300 mtpd installation. Major equipment being supplied by Allis-Chalmers includes: a 14 ft. × 197 ft. rotary kiln with a suspension preheater; a cooler with an 8 ft. × 22 ft. inclined section and a 10 ft. × 42 ft. horizontal section; and a roller mill.

Martinique

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.113	0.119	0.129	—	—

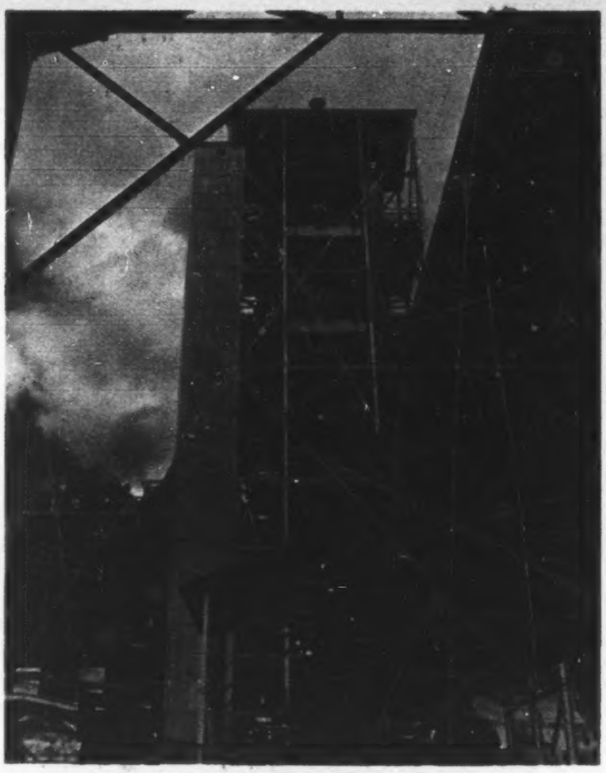
Mexico

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
11.612	12.584	13.277	14.5	16

• Cemento Portland Nacional S.A. (Empresas Tolteca de Mexico, S.A. group): Hermosillo, Sonora (plant is about 25 km from Hermosillo). New 1 million tpy plant scheduled to go onstream in 1981. F. L. Smidth will supply major equipment and also will erect and commission the plant. Engineering is being done by Blue Circle Industries, which has a 49% share in the company. The main FLS equipment consists of a 4.35 m. dia. × 66 m. kiln with single-string, four-stage preheater and precalciner, Folax grate cooler, two 4.8 m. dia. × 8.57 m. long raw mills with 1800 B Symetro gears, two 4.8 m. × 12.5 m. long cement mills with 2020 BC Symetro gears, all arranged for closed-circuit grinding, crushing, homogenizing and dedusting equipment, all auxiliary and electrical equipment including instrumentation and control.

• Cimentos de Chihuahua, S.A.: Chihuahua, Chih. In conjunction with Sereland of Spain as engineer, Cementos de Chihuahua decided on a new clinker line of 1,700 tons per day capacity. F. L. Smidth & Co. received an order in 1979 for a kiln department, raw mill department and homogenizing department. The plant is expected to be ready in late 1981. The kiln is 4.55 m. dia. × 68 m. long, with a four-stage preheater and Unax planetary cooler. The raw mill is 4.8 m. dia. × 9.0 m. long with central discharge and two compartments, arranged for closed-circuit grinding.

• Cooperativa Manufacturera de Cemento Portland "La Cruz Azul," S.C.L.: Cruz Azul, Hidalgo. Plant expansion start-up was scheduled for 1979. Fuller Co. equipment supplied includes: 17 ft. × 270 ft. rotary kiln with four-stage twin preheater; clinker cooler; blending equipment.



EL SALVADOR: Cemento de El Salvador S.A. Expansion rated at 1,000 mtpd scheduled for 1979 operation at El Ronco, Metapan plant *(Courtesy: Allis-Chalmers)*

• Cooperativa Manufacturera de Cemento Portland "La Cruz Azul,": Lagunas, Oaxaca. For this new plant, F. L. Smidth & Co. has received orders for a Tirax-Unidan raw mill of 4.6 m. dia. × 8 m. long, with a 1600 B Symetro central drive; also, two Unidan mills, each 3.8 m. dia. × 12 m. long with 1600 B Symetro central drives.

• Cementos Mexicanos S.A.: Valles, Est. San Luis Potosi. In the autumn of 1978, Cementos Mexicanos S.A. placed an order with F. L. Smidth for the main machinery for a 2,200 tpd expansion of their Valles plant. The equipment comprises a 4.15 × 58 m precalciner kiln with type 824S Folax cooler, a 4.6 × 7.6 m, 2200 kW raw mill, and a 4.6 × 14 m, 4400 kW cement mill, both with Symetros.

• Cementos Mexicanos S.A.: Monterrey, Est. Nuevo Leon. At the beginning of 1979, Cementos Mexicanos S.A. followed up their Valles expansion project with a similar extension of their Monterrey plant. The new kiln and associated raw mill and cement mill will be identical to the F. L. Smidth Valles equipment.

• Cementos Mexicanos S.A.: Torreon, Est. Coahuila: Cementos Mexicanos S.A. put the third kiln in their Torreon plant into operation in August 1979. F. L. Smidth supplied a 4.55 × 68 m kiln with four-stage preheater, Unax cooler and TUM 4.6 × 7.6 m raw mill with Symetro gear.

• Cementos Maya S.A. commissioned their second production line in the Merida, Yucatan plant in the autumn of 1978. The 4.55 × 127 m two-stage cyclone preheater kiln, the TUM 4.6 × 7.6 m raw mill with Symetro, and the UM 3.8 × 11.2 m cement mill with Symetro were supplied by F. L. Smidth.

• Cementos Guadalajara S.A. put a new production line into operation at their Ensenada, Baja California plant during October 1979. The equipment comprises a four-stage preheater kiln with Unax planetary cooler, a TUM 4.6 × 7.6 m, 2200 kW raw mill and a UM 3.8 × 11.2 m, 2,200 kW cement mill, both with Symetros. The main machinery was supplied by F. L. Smidth.

Cementos Apasco S.A. has placed an order with F. L. Smidth for equipment for a new 2,200 tpd cement plant at Macuspana in the state of Tabasco. The order includes a 4.15 × 58 m rotary kiln, a Tirax mill, and a Unidan mill. Operation scheduled for 1980.

- Cementos Vera Cruz S.A. (Empresas Tolteca de Mexico, S.A. group): Orizaba, Vera Cruz. Installing one Polysius Prepol preheater with precalcining/kiln, rated at 4200 mtpd.

Nicaragua

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.202	0.226	0.226	0.35	0.35

Panama

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.300	0.282	0.270	0.4	0.6

- Empresa Estatal de Cemento "Bayano" at Calzada Larga, north of Panama City, started production in 1978. All equipment was supplied by F. L. Smidth on a turnkey basis; it includes an MPS roller mill, a 1,000 tpd kiln with four-stage cyclone preheater and a Unax planetary cooler, finish mill, and packing plant.

Trinidad and Tobago

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.255	0.238	0.215	—	—

SOUTH AMERICA

ECUADOR:
La Cemento Nacional. Expansion of Cerro Blanco plant via a 1,500 mptd addition: scheduled for 1979 operation *(Courtesy: Allis-Chalmers)*

Argentina

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
5.464	5.712	6.002	9	9

- Company Cementos Noa: Province of Salta. Planning construction of 1,800 mtpd plant.
- Juan Minetti S.A.: New 540,000 mtpy plant scheduled for operation in 1980. Major equipment supplied by KHD Humboldt Wedag and cooperating partner Centunion (Spain) will include: 4.4 × 64 m rotary kiln; 4.0 × 13 m, 2,790 kW clinker grinding mill rated at 100 tph.
- Loma Negra Compania Industrial Argentina, S.A.—Olivarria: Expansion being performd by Polysius. Includes: modification of existing long, dry kiln to two-stage preheater unit; capacity increase from 1,200 mtpd to 1,600 mtpd; modification of existing Polysius preheater to precalcining; capacity increase from 2,400 to 3,500 mtpd; one 4,000-hp cement mill, 4.2 × 14 m, rated for 80 mtph at 2900 Blaine.
- Cemento Noroeste: La Rioja province. Projected new plant with a capacity of 350,000 mtpy.
- Corp. Cementera Argentina S.A.: Capdeville plant. Expansion incorporating F. L. Smidth 2,000-tpd kiln with a four-stage cyclone preheater and a Folax grate cooler.
- Corp. Cementera Argentina S.A.: Yocsina plant. Adding F. L. Smidth four-stage cyclone preheater.
- Calera Avellaneda S.A.: Olavarria. Converting second production line to the KHD Humboldt Wedag Pyroclon process for raw meal precalcining. Modification will raise clinker production rate of that line from 1,000 mtpd to 1,500 mtpd.

Bolivia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.227	0.220	0.153	0.5	0.8

- Compania Boliviana de Cemento S.A.M.: Irpa plant expansion via a dry process 600 tpd kiln.
- Fabrica Nacional de Cemento S.A.: Cal Orcke plant expansion via one 200,000 tpy dry process kiln.
- Sociedad Boliviana de Cemento S.A.: Viacha plant expansion via a 500 tpd F. L. Smidth dry process kiln, onstream in 1979.
- Lafarge Consultoria e Estudios, subsidiary of Lafarge Conseils et Etudes (Lafarge Group) for Latin America, has been awarded a consulting engineering contract in Bolivia for the construction of the new Yacuces cement plant in the province of Chiquitos, Department of Santa Cruz. The contract was awarded by the Corporacion Regional de Desarrollo (Regional Development Agency) of Santa Cruz. The new dry process plant will have an annual clinker production ca-

Quantities in million metric tons

pacity of 335,000 tons, and the kiln will be equipped with a cyclone preheater. Start-up is scheduled for 1982.

Brazil

Cement production				Cap. (est.)
1975	1976	1977	1978	1979
16.737	19.147	21.123	22.5	25.5

- Cimento Maua, S.A. ("CNCP"***): Cantagalo, State of Rio de Janeiro. New plant, scheduled onstream in 1980, has been designed for a 700,000 mtpy production. Equipment to be supplied by a consortium of F. L. Smidth and Christiani-Nielsen will include a 3.95×56 m precalciner kiln with Folax grate cooler; a 5.2×9.75 m raw mill; and a 3.8×12 m cement mill. CNCP and Lafarge Consultoria e Estudios (Brazil) are the consulting engineers on the project.
- Camargo Correa Industrial S.A.: Expanding Apiai, Sao Paulo plant with a 3,500 tpd precalciner-preheater kiln addition. Expansion will also include crushing, grinding, material handling, and shipping equipment. Engineering design to be provided by Bendy-Teixera Engenharia Ltda. of Rio de Janeiro. Scheduled completion: 1980.
- Cimento Itau do Parana S.A.: Rio Branco do Sul, Parana plant, is doubling capacity. F. L. Smidth is supplying new equipment, including: 4.15×60 m kiln with four-stage preheater and Unax planetary cooler; 4×7 m raw mill; 4×12 m cement mill.
- Cia de Cimento Portland Gaucho: Pinheiro Machado, Rio Grande do Sul plant expansion via one 200,000-tpy dry process kiln. Was scheduled onstream in 1979.
- Cia de Cimento Portland Poty: Sao Jose Paulista. Pernambuco plant expansion via one 2,000 tpd dry process kiln. Scheduled operation: 1980.
- Cia Materiais Sulfurosos-Matsulfur: Montes Claros, Minas Gerais plant expansion via a F. L. Smidth 2,000 tpd dry process kiln. Scheduled operation: 1979.
- Cimento Tocantins S.A.: Sobradinho plant expansion planned via a 1,000 tpd dry process kiln.
- Cimenvale—Mineracao e Cimento Vale do Itajai S.A.: New plant at Brusque, Santa Catarina, under construction.
- Ciminas—Cimento Nacional de Minas S.A.: Doubling of present capacity of Pedro Leopoldo plant under consideration.
- Cia. Agro-Industrial de Monte Alegre: New plant with one wet process 1,000 tpd kiln was due onstream in 1979.
- Cia Cearense de Cimento Portland: Sobral, Ceara plant expansion with one F. L. Smidth 1,000 tpd dry process kiln. Was scheduled onstream: 1979.
- Cia de Cimento Atol: Sao Miguel dos Campos Alagoas. New plant with one 750 tpd dry process kiln. Onstream in 1977. Major equipment supplied by Fives-Cail Babcock in partnership with Brazilian subsidiary Fives Lille do Brasil S.A. Major equipment includes: 3.6 m×51 m rotary kiln with a cyclone preheater; combined raw grinding and drying ball mill; two 1065 kW clinker ball mills.
- Cia de Cimento Portland Goias: Sorocaba. In 1978, purchased following Polysius equipment: Dopol 4.0×3.6×54 m preheater kiln rated at 800 mtpd, with Recupol grate cooler; 3.4×12.25 m raw mill rated at 95 mtph with one 6.5 m diam. separator; 3.8×14.5 m cement mill rated at 68 mtph.
- Cia de Cimento Portland de Sergipe: New plant with one 1,000 tpd dry process kiln at Laranjeiras, Sergipe. Was scheduled onstream in 1979.
- Ibacip—Industria Barbalhense de Cimento Portland S.A.: Barbalha, Ceara. New 60,000 tpy plant with one dry process kiln. Was scheduled onstream in 1978.
- Cimento Santa Rita: Itapevi cement works. Increasing capacity of No. 4 kiln line from present 800 mtpd to 1,350 mtpd by addition of Humboldt Wedag Pyroclon system for precalcination of raw meal. Equipment and installation to be provided by a consortium of KHD Humboldt Wedag and Zanini of Brazil.

Chile

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.939	0.963	1.126	1.1	1.3

Colombia

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
3.154	3.622	3.430	5	5

- Acerias Paz del Rio: Setting up a 600,000 tpy slag cement plant at Belencito, province of Boyaca. Major equipment suppliers are Kawasaki Heavy Industries Ltd. and Marubeni Corp. Completion is scheduled for 1980.
- Fabrica de Cemento Samper, S.A. has awarded a contract to F. L. Smidth for the extension of its La Calera plant, 30 km from Bogota. The 1,500 tpd production line includes a 1,500 tpd 5.0×165 m rotary kiln with two-stage cyclone preheater and Unax planetary cooler.
- Cementos del Caribe, S.A.: Barranquilla. Expanding wet process plant with Allis-Chalmers 14 ft.×12.5 ft.×450 ft., 800 mtpd kiln and Allis-Chalmers 900 mtpd stoker-type cooler. Scheduled to be in operation in 1980.

Ecuador

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.593	0.608	0.623	1	1.4

- Empresa Cementos Selva Alegre S.A.: Building a 345,000 mtpy plant at Otavalo, which was scheduled for start-up in 1979. Allis-Chalmers Canada Ltd. is furnishing major equipment, including: 206 ft.-high preheater, 14 ½ ft.×204 ft. rotary kiln, stoker cooler, raw and finish grinding mills. SNC Inc. of Montreal is acting as the engineer/manager.
- La Cemento Nacional: Guayaquil. Expanding Cerro Blanco plant. F. L. Smidth supplying the following major equipment for a 1,500 mtpd addition: 4.35×66 m kiln equipped with a single-string, four-stage preheater; Folax grate cooler; 4.6×8.25 m Tirax Unidan raw

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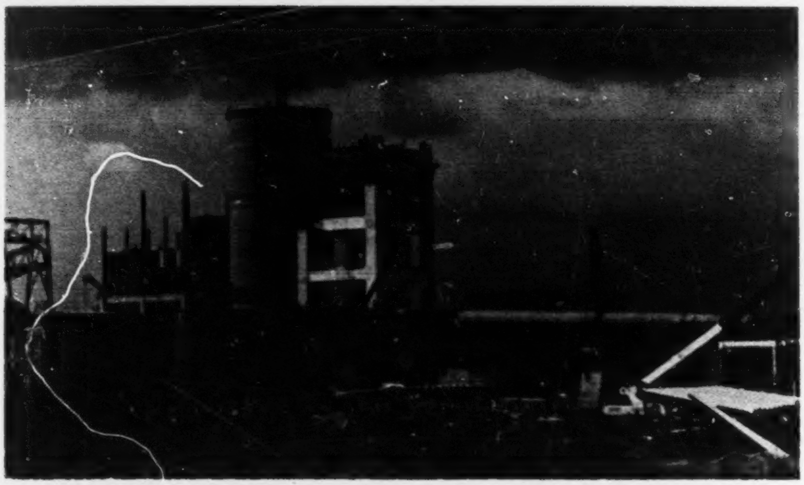
****"CNCP"—Companhia Nacional de Cimento Portland (CNCP) was formed in 1979 by Lafarge S.A. of France and Lone Star Industries, Inc. of U.S.A., to bring together two Lafarge and two Lone Star plants in Brazil under this new CNCP name. The four cement plants already in production are located in Guaxindiba, near Rio de Janeiro (Lone Star's subsidiary, the old Companhia Nacional de Cimento Portland); Aratu, in the State of Bahia (Lone Star's subsidiary Cimento Aratu, S.A.); Belo Horizonte, State of Minas Gerais (Lafarge's Companhia Mineira de Cimento Portland); Arcos, State of Minas Gerais (Cimento Portland Pains). Newest addition to the group is Cimento Maua, now being built.*



VENEZUELA: Cementos Catatumba. New 600,000 tpy expansion in State of Zulia is scheduled for 1980 operation. *(Courtesy: Lafarge Consultants Ltd.)*

mill; continuous silo blending system; dust collectors. Scheduled onstream in 1980.

• Empresa Industrias Guapan S.A.: Azogues. New plant scheduled for 1980 start-up. Equipment, to be supplied by Fuller Co., includes: one 13 ft. 6 in. × 190 ft. rotary kiln; 1,100-mtpd suspension preheater; 13 ft. dia. × 26 ft. Aerofall raw mill; 12 ft. dia. × 37 ft., two-compartment finish mill; air-quenching grate cooler; blending silo aeration system; Airslide fluidizing gravity conveying systems; Fuller-Kinyon pumps; Plenum-Pulse dust collectors; central control console.

Paraguay

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.138	0.155	0.200	0.7	0.7

Peru

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
1.950	1.966	2.100	3.1	4.1

• Cementos Lima S.A.: 3,000 tpd expansion at Ataconga plant (near Lima); was scheduled onstream in 1979. Major equipment includes: precalciner kiln; 6,000-hp raw mill; 6,000-hp cement mill. Holderbank Consulting Ltd. (Canada) holds the engineering work contract.

• Cementos Norte Pacasmayo: Expanding Pacasmayo plant from 1,000 to 3,000 mtpd, with completion scheduled for 1979. Fuller Co. has equipment contract, which includes: raw and finish open-circuit mills; 13 ft. × 190 ft. rotary kiln; preheater with flash calciner; coolers; dust collectors; fluidizing conveyors; and blending equipment.

• Cemento Yura S.A.: Arequipa. Adding one 1,000 tpd dry process kiln. Fuller Co. supplied the following equipment: one 12 ft. × 37 ft. raw mill; one blending system; one 12 ft. × 37 ft. finish mill; five Plenum Pulse dust collectors. Start-up was expected in 1979.

Surinam

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.031	0.052	0.047	0.06	0.06

Uruguay

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
0.632	0.678	0.691	0.75	0.75

• Administration Nacional de Combustibles Alcohol y Portland (ANCAP): Adding 500 mtpd system to its existing 400 mtpd plant in Paysandu. Major equipment, supplied by Fuller-GATX (Pty) Ltd. of South Africa, includes: rotary kiln, four-stage preheater, clinker cooler, mills, blenders, pneumatic conveyors, dust collection equipment. Start-up was scheduled for 1979.

Venezuela

Cement production			Capacity (est.)	
1975	1976	1977	1978	1979
3.468	3.475	3.406	5.2	8.1

• Cementos Caribe: Puerto Cumarebo (near Coro on northern coast of Venezuela). New 1 million mtpy plant onstream in 1979. Humboldt Wedag supplied major equipment, including: Pyroclon precalcining suspension preheater; 17 ft. × 270 ft. rotary kiln section; planetary cooler. Holderbank Consulting Ltd. (Canada) provided engineering and management work.

• Cementos Catatumbo: Building new 600,000 mtpy plant in State of Zulia. Lafarge Consultants Ltd. (Canada) has contract for design, procurement, project management, and start-up assistance. Creusot-Loire Entreprises will supply the major equipment, including preheater-equipped kiln. Scheduled onstream in 1980. Plant will be equipped with a four-stage preheater/precalciner rotary kiln, 145 tph raw mill, and 75 tph finish mill.

• Cemento Andino S.A.: Valera. In 1978, purchased following equipment from Polysius Corp.: precalcining system with 4.2 x 65m kiln rated for 1,800 mtpd; 4.4 × 10.5m raw mill rated for 138 mtph, with two 5.2m-diam. separators; 4.0 × 13.5m cement mill rate for 90 tph, with two separators.

• C.A. Venezolana de Cementos: Pertigalete plant. Expansion in 1977 added one 800-tpd wet process kiln. Expansion scheduled for 1979 operation would incorporate a 2,700-tpd dry process kiln.

• Consolidada de Cementos C.A.: Expansion at San Sebastian, Est. Aragua plant via one 1,500 tpd dry process kiln. Was scheduled onstream in 1979. ●

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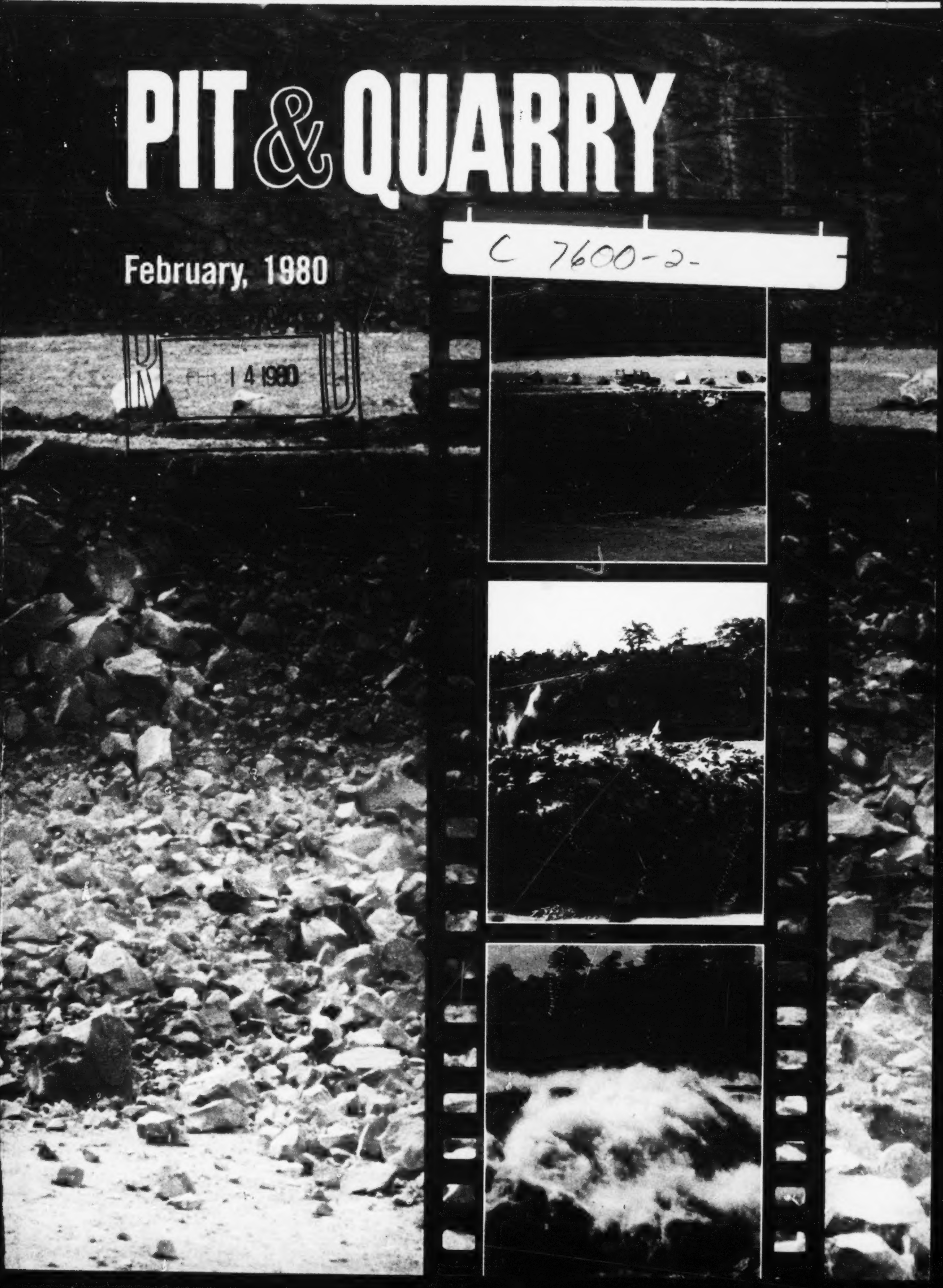

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1979 Nov.	1978 Nov.	% Change
Nonresidential Building	$ 3,849,112	$ 3,621,663	+ 6%
Residential Building	4,716,502	5,972,983	− 21
Nonbuilding Construction	2,184,898	2,040,317	+ 7
Total Construction	$10,750,512	$11,634,963	− 8%

	1979 11 mos.	1978 11 mos.	% Change
Nonresidential Building	$ 46,309,007	$ 42,022,075	+ 10%
Residential Building	70,430,678	70,207,717	0
Nonbuilding Construction	39,420,323	37,714,745	+ 5
Total Construction	$156,160,008	$149,944,537	+ 4%

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(1972 = 100, seasonally adjusted)

September, 1979	October, 1979	November, 1979
185	171	156

**Based on statistics compiled by the F. W. Dodge Div., McGraw-Hill Information Systems Co.*

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1979 Dec.	1978 Dec.	% Change
Nonresidential Building	$ 3,558,553	$ 3,024,773	+ 18%
Residential Building	4,303,847	4,715,319	− 9
Nonbuilding Construction	2,651,008	2,220,538	+ 19
Total Construction	$10,513,408	$ 9,960,630	+ 6%

	1979 12 mos.	1978 12 mos.	% Change
Nonresidential Building	$ 49,659,492	$ 45,045,834	+ 10%
Residential Building	74,685,642	74,949,473	—
Nonbuilding Construction	42,032,763	39,934,701	+ 5
Total Construction	$166,377,897	$159,930,008	+ 4%

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(1972 = 100, seasonally adjusted)

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**Based on statistics compiled by the F.W. Dodge Div., McGraw-Hill Information Systems Co.*

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PIT&QUARRY

April, 1980

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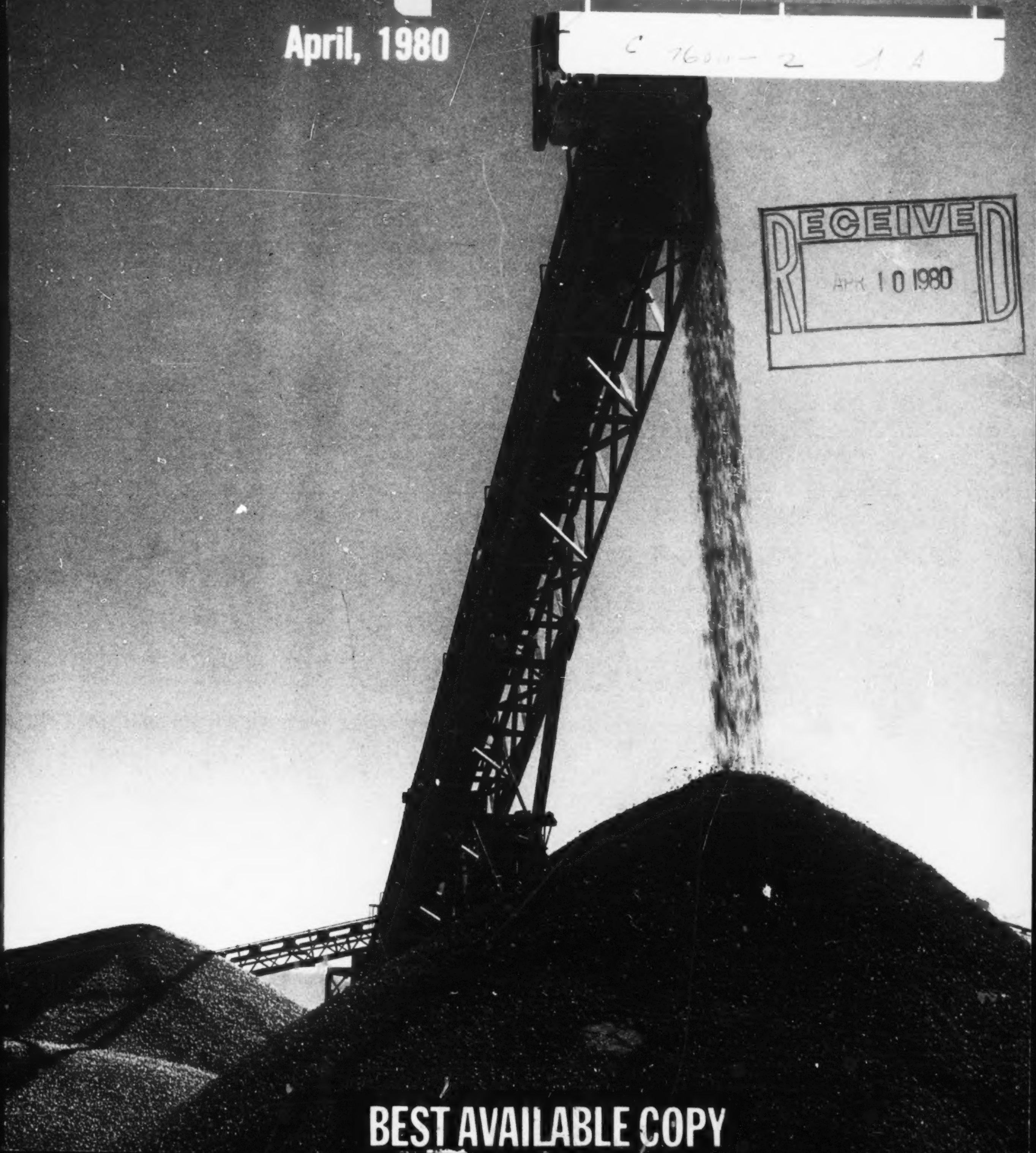

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ON THIS MONTH'S COVER

New firm brings historic old Tomkins Cove quarry in New York back to life with new 700-tph plant. See page 44. Photo courtesy L.B. Smith, Inc.

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 Jan.	1979 Jan.	% Change
Nonresidential Building	$ 4,351.8	$ 3,958.7	+10%
Residential Building	4,100.0	4,530.0	-9
Nonbuilding Construction	2,628.4	3,297.6	-20
Total Construction	$11,080.2	$11,786.3	-6%

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(1972 = 100, seasonally adjusted)

November, 1979	December, 1979	January, 1980
156	183	190

Based on statistics compiled by the F.W. Dodge Div., McGraw-Hill Information Systems Co.

U.S. Gypsum's Shoals Plant Receives Lloyd Yeager Award

The United States Gypsum Company's Shoals, Ind. plant recently became the first member company plant of the Gypsum Association to receive the Lloyd H. Yeager Award commemorating two million or more employee hours without a lost workday case. The inscribed award plaque honoring this outstanding safety achievement was presented to Donald N. McCoy, works manager.

The Yeager Award is one of many to be earned by McCoy and his employees. The Shoals plant has won the Gypsum Association Presidential Division Award for the last two consecutive years, the No Lost Workday Case Award for 13 of the 23 years the facility has been in operation, and innumerable Certificates of Achievement recognizing the safety records of individual departments within the plant. One of the most prestigious awards received by the Shoals facility is the Sentinal of Safety Award, an annual award given to the metal and nonmetal mine with the best safety record in the nation. This trophy, sponsored jointly by the American Mining Congress and the U.S. Mine Safety and Health Administration, was presented in April 1979.

The Lloyd H. Yeager Award, named in honor of the former Gypsum Association executive vice president whose vision and leadership inspired the creation of early industry safety programs, is presented to member company gypsum plants achieving a record of one million or more employee hours without a lost workday case. Fewer than 20 plants have qualified for this honor in its 12 year history.

PIT & QUARRY

May, 1980

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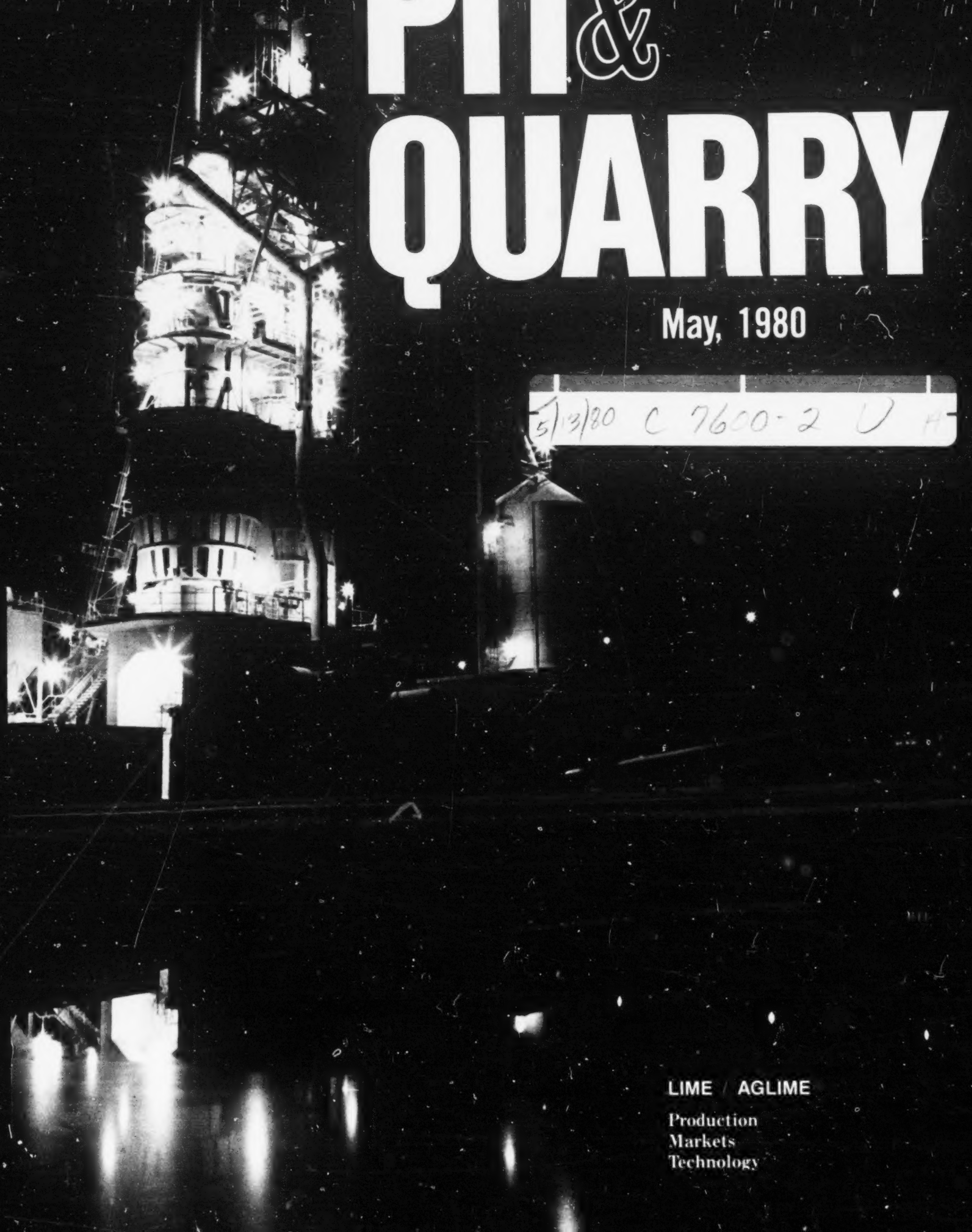

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ON THIS MONTH'S COVER

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 Feb.	1979 Feb.	% Change
Nonresidential Building	$ 3,634.8	$ 3,231.6	+12
Residential Building	4,337.4	4,588.1	−5
Nonbuilding Construction	2,421.6	6,045.4	−60
Total Construction	$10,393.8	$13,865.1	−25

	1980 2 mos.	1979 2 mos.	% Change
Nonresidential Building	$ 7,969.4	$ 7,197.8	+11
Residential Building	8,430.9	9,119.2	−8
Nonbuilding Construction	5,044.3	9,344.8	−46
Total Construction	$21,444.6	$25,661.8	−16

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JUNE 1980

Bauma '80/Hannover:
We were there

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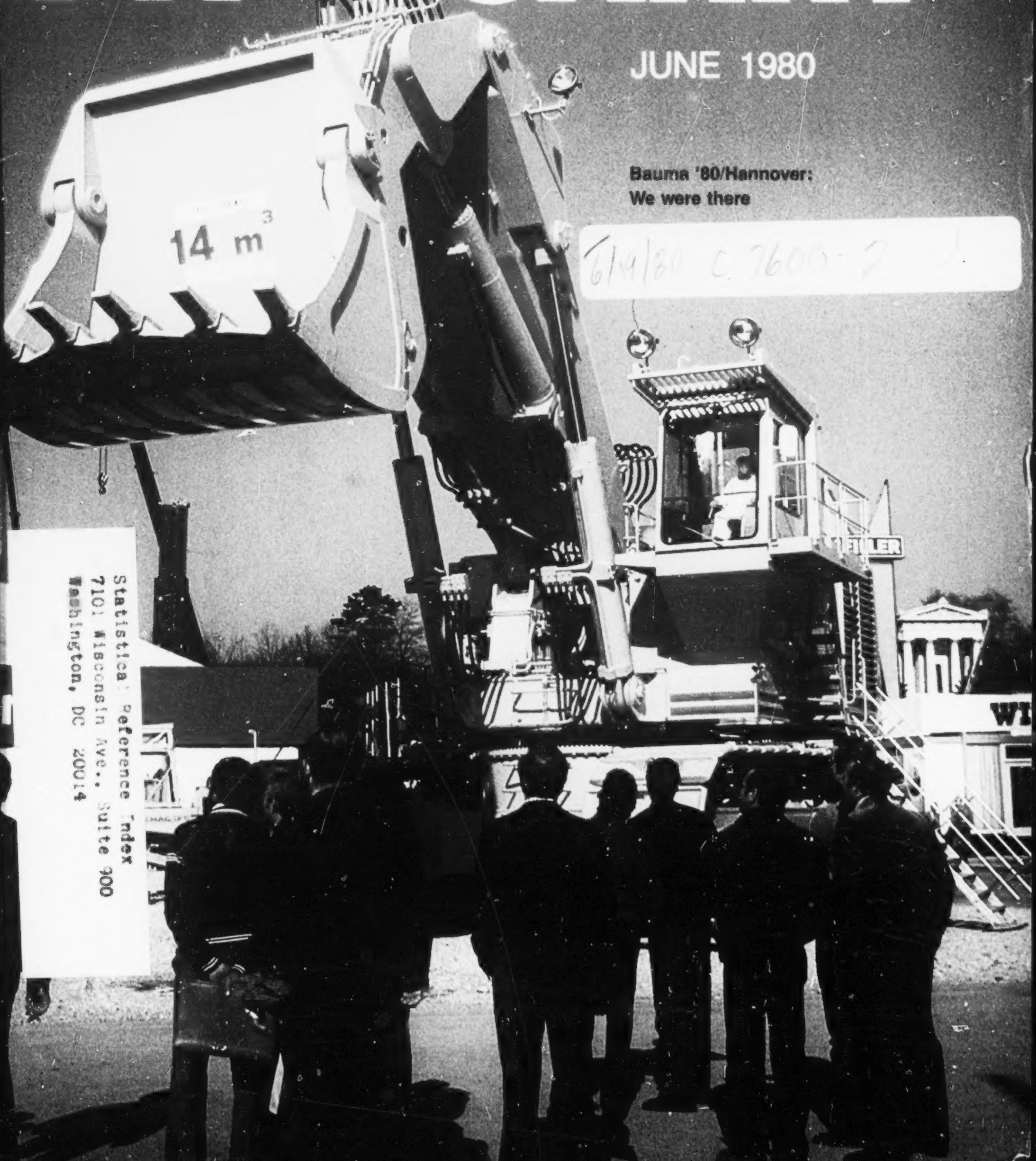

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AND NEXT MONTH

Pit & Quarry's annual Cement Issue will feature:

- Oregon Portland Cement's new 500,000 tpy plant
- Plant modernizations in Utah and South Dakota
- Cementos Caribe's new 3,000 tpd plant in northwestern Venezuela
- Cement and construction minerals industry—financial reports survey

ON THIS MONTH'S COVER

One of the literally thousands of exhibits at Bauma '80, the mammoth construction equipment show held every 3 years in Munich, Germany. See pictorial review and Editor's Page for comments about this international event that drew visitors from around the world.

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 March	1979 March	% Change
Nonresidential Building	$ 4,272.5	$ 4,155.6	+ 3
Residential Building	4,584.5	6,984.2	− 34
Nonbuilding Construction	2,428.7	3,818.5	− 36
Total Construction	$11,285.7	$14,958.3	− 25

	1980 3 mos.	1979 3 mos.	% Change
Nonresidential Building	$12,159.9	$11,361.7	+ 7
Residential Building	13,003.0	16,111.0	− 19
Nonbuilding Construction	7,454.0	13,163.0	− 43
Total Construction	$32,616.9	$40,635.7	− 20

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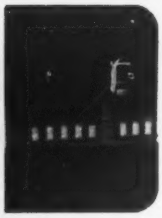
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ON THIS MONTH'S COVER

Oregon Portland Cement's new 500,000 tpy plant, located in eastern Oregon, is first cement plant built in the Northwest since 1967. Rotary kiln is equipped with 4-stage preheater and satellite coolers. See pg. 68.

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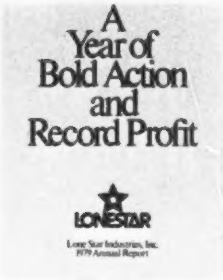
A
Year of
Bold Action
and
Record Profit

LONESTAR

Lone Star Industries, Inc.
1979 Annual Report

Gearing up for the 80's

Pit & Quarry's annual financial reports round-up:

- **Record revenues in 1979 for cement, concrete, aggregates**
- **Sun Belt states offer growing markets for construction minerals**
- **Mergers continue changes in corporate alignments**
- **Construction upswing expected by year-end**

High demand levels last year for cement, concrete, and construction aggregates led to record revenues for most of the construction minerals* producers listed in this PIT and QUARRY survey of 1979 annual reports. Because of the ongoing slump in residential and nonresidential construction, cement consumption in the United States is expected this year to be down between 8 and 10%.

Construction

Total new construction put in place in the United States in 1979 amounted to $227 billion in current dollars, equivalent to a calculated $114 billion in constant 1972 dollars. Compared with 1979 physical volume, a 9% drop is predicted for 1980 by the Department of Commerce ("U.S. Industrial Outlook," January 1980).

**The minerals and mineral products designated "construction minerals" in this report, and average percentages of their use in construction are: portland cement, 100%; masonry cement, 100%; calcined gypsum, 100%; expanded clay, shale and slate, 100%; iron blast furnace and steel slag, 98%; sand and gravel, 97%; pumice, 87%; crushed stone, 75%; exfoliated vermiculite, 65%; dimension stone, 60%; expanded perlite, 35%; crude gypsum, 30%; fly ash, 13%; lime, 6%.*

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Compared with the peak physical volume of 1973, the forecast said, new construction activity as a whole should be one-fifth lower in 1980.

Housing start forecasts for 1980 now range between 1.4 million to somewhat below 1 million, compared with 1.75 million in 1979 and the record 2 million in 1978. Construction contracting this year is expected to total $155 billion, about 7% below the 1979 amount, according to a forecast issued in April by the F. W. Dodge Division of McGraw-Hill Information Systems Co.

Cement

Shipments of finished portland cement from plants in the United States (including Puerto Rico) in 1979 amounted to 84.9 million short tons. This was about the same as in 1978 and about 4.3% lower than the 1973 record. The 1979 value of hydraulic (84.5% finished portland; 5.5% masonry) cement reached $3.9 billion, resulting from an average price rise of 12% for the year.

Imports of cement and cement clinker for consumption in the United States in 1979 reached a record 9.4 million tons, 42% above the 1978 total of 6.6 million tons and 40% above the 1973 record of 6.7 million tons. The imports constituted 11.1% of plant shipments in 1979. Major supplying countries included Canada, Japan, Mexico, the Bahamas, the United Kingdom, France, Spain, Norway, and Peru. As usual, cement exports were insignificant amounting to 125,000 tons in 1979. Shipments were made to nearby locations in Canada, Mexico, and the Caribbean.

According to a preliminary Department of Commerce estimate, the value of cement industry shipments is expected to rise 5% to $4.1 billion this year, despite the projected volume drop, because of price increases. Average values for a ton of portland cement rose from $31.09 in 1975 to an estimated $46 in 1979. Prices for May 1980, as quoted in *Engineering News-Record,* ranged from $47.40 per ton in Baltimore to $64.00 in Chicago and $68.86 in Los Angeles.

Percentage of portland cement 1979 shipments by type of customer were: ready-mixed concrete producers, 67%; concrete products (block, brick, pipe, precast, prestressed products) manufacturers, 14%; building material dealers, 8%; highway contractors, 5%; other contractors, government agencies, and miscellaneous uses, 6%. Masonry cement shipment in 1979 amounted to 3.81 million tons, compared with 4.18 million in 1978. Prices of masonry cement (in 70-lb. bags) in May 1980, as noted in *Engineering News-Record,* ranged from $2.54 in Atlanta to $4.10 in Chicago.

Fifty-seven companies operated 162 plants in 40 states and two companies operated two plants in Puerto Rico in 1979 for the production of portland, masonry, and calcium aluminate cements. Annual real growth in cement shipments has been projected at 2 to 3% for the next 5 years. Regionally, the southern states are expected to continue to have an expanding share of the cement market.

Aggregates

Sand and gravel—An estimated total of 1 billion tons of sand and gravel, valued at about $2.5 billion, was reported sold or used in the United States in 1979. Construction sand and gravel constituted 97% of the uses, and industrial applications accounted for the other 3%. Construction allocations were 43% for aggregate for portland cement concrete; 15% for asphaltic concrete aggregate; 22% for road bases and coverings; 17% for fill; and 3% for railroad ballast, snow and ice control, etc. Demand for sand and gravel is forecast to increase at an annual rate of 1.6% for the next 5 years.

Crushed stone—Output of crushed stone in 1979 is estimated at 1.037 billion tons valued at $3 billion. About 75% of production was used for construction, including dense-graded road-base stone, concrete aggregate, road stone, cement, bituminous aggregate, etc. Demand for crushed stone is expected to grow at an annual rate of 3% for the next 5 years.

Dimension stone—Production of dimension stone in 1979 was estimated at 1.39 million tons, valued at $125 million. Demand is not expected to grow in the future.

Slag—About 37 million tons of iron and steel slags were sold or used in the United States in 1979. Construction uses accounted for nearly all of the output, including incorporation of the slag into road bases, fill, asphaltic concrete aggregate, and portland cement concrete aggregate.

Pumice and volcanic cinder—Mine production of pumice and volcanic cinder in the United States amounted to an estimated 4.856 million tons in 1979. Total estimated value of the amount sold or used was $16.5 million. The major uses of pumice and volcanic cinder combined were for road construction (47%) and concrete aggregates and admixtures (40%) Demand for the next 5 years is expected to increase at an annual rate of 4%.

Perlite—Domestic mine production of perlite in 1979 was estimated at 950,000 short tons valued at $15.7 million. Crude ore came from 13 mines operated by 12 companies in 6 western states. The ore was expanded by 45 companies at 80 plants in 33 states. Demand for perlite is expected to increase at an annual rate of about 3.4% for the next 5 years. In 1979, 45% of production was used for insulation board, plaster, and concrete aggregate.

Vermiculite—Mine production of vermiculite sold or used in the United States in 1979 was estimated at 349,000 tons, valued at $22 million. Most of the crude vermiculite was shipped to 49 exfoliating plants in 29 states. The major uses for exfoliated vermiculite were: insulation, 30%; lightweight concrete aggregate, 25%; plaster and cement aggregate, 10%; and agriculture, 33%. Demand for vermiculite is expected to increase at an annual rate of about 5% for the next 5 years.

Gypsum

Output of crude gypsum mined in the United States was estimated at 14.3 million tons, valued at $101 million dollars. Imports, including anhydrite, amounted to 7.6 million tons. Apparent consumption (crude gypsum + by-product gypsum + imports − exports + industry stock adjustment) amounted to 22.5 million tons. Of the total supply of crude gypsum (including 700,000 tons of by-product gypsum), 16.7 million tons (74.2%) was calcined for gypsum products, and 5.8 million tons (25.8%) was used mainly as a cement retarder or as agricultural land plaster. The calcined gypsum was sold as prefabricated products or as plaster. Sales of gypsum for cement use was 4.2 million tons (19%). Demand for gypsum is expected to increase at an annual rate of about 2.7% through 1985.

Lime

Construction uses accounted for 6% of the estimated 20.39 million tons of lime produced in 1979. The construction applications include soil stabilization, mason's lime, and finishing lime. Demand for lime is expected to increase at an annual rate of about 3.9% for the next 5 years.

Fly ash

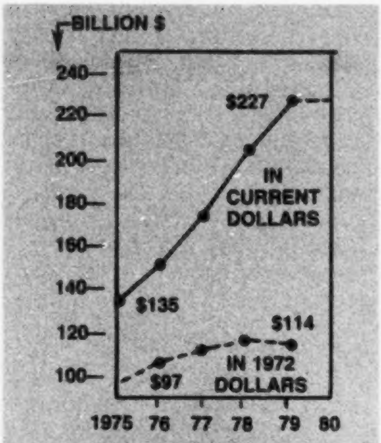
This by-product of electrical energy generation in coal-fired power stations can be considered the sixth most abundant solid mineral resource in the United States. About 13% of an estimated 50 million short tons of fly ash collected in 1979 was used in construction applications.

Fly ash use as a construction mineral includes incorporation in Type 1-P cement; mix with raw material for producing cement clinker; lightweight aggregate; stabilization and roads; fill for roads, reclamation, and ecology dikes; and filler in asphalt mix.

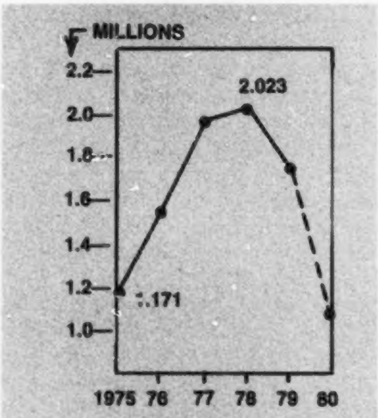
Concrete

Ready-mixed concrete producers accounted for 67% of the 1979 cement shipments in the United States. Since 1 cu. yd. of ready-mix requires about ¼ of a short ton of cement, the 1979 output is estimated at 228 million cu. yd. with an estimated value of $7.73 billion.

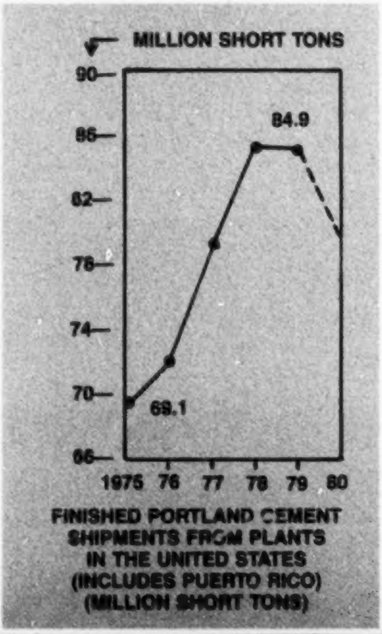
For 1980, the "U.S. Industrial



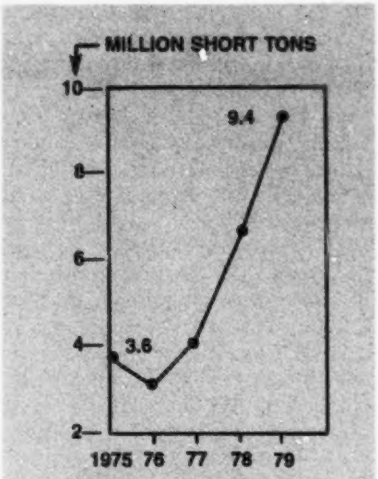
TOTAL NEW CONSTRUCTION PUT IN PLACE IN THE UNITED STATES— VALUE IN BILLION DOLLARS



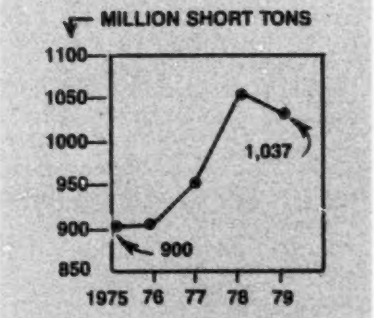
NEW HOUSING UNITS STARTED



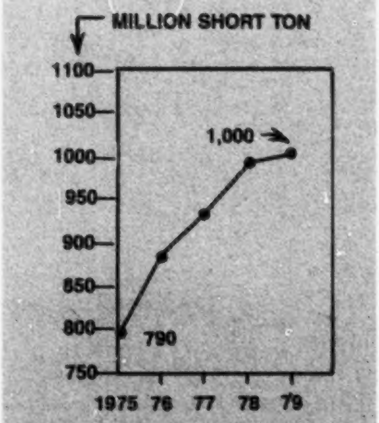
FINISHED PORTLAND CEMENT SHIPMENTS FROM PLANTS IN THE UNITED STATES (INCLUDES PUERTO RICO) (MILLION SHORT TONS)



CEMENT AND CEMENT CLINKER-IMPORTS (In million short tons)



CRUSHED STONE SHIPMENTS (In million short tons)



SAND AND GRAVEL SHIPMENTS (In million short tons)

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Outlook" predicted that the value of shipments for the ready-mixed concrete industry should be about $8.85 billion, about 15% more than 1979 shipment values. This value, the forecast notes, reflects a substantial price rise and about a 6% drop in physical volume of shipments.

As quoted in the May 8, 1980 *Engineering News-Record*, ready-mix prices per cu. yd. ranged from $37.00 (3,000 psi) and $42.75 (5,000 psi) in Philadelphia to $49.00 and $55.00 in San Francisco. The Department of Commerce forecast in the "U.S. Industrial Outlook" is for a 2.1% annual increase in shipment volume between 1979 and 1984. This represents a slightly larger growth rate than the 2% estimated for construction activity, but is somewhat less than the 2.3% for cement.

Concrete block and brick shipments in 1979 totaled an estimated $1.34 billion. The Department of Commerce forecast a 7% drop in volume for this year, but a 7% gain in value of industry shipments to $1.57 billion, resulting from anticipated price increases. Industry shipments in the 1979-1984 period are anticipated to rise 1.9% in real terms on an annually compounded basis.

For concrete products encompassing concrete pipe, precast and prestressed concrete, and dry concrete mixes, the value of shipments in 1979 amounted to an estimated $3.81 billion. The Department of Commerce has estimated that the value would reach about $4.34 billion in 1980, equivalent to a 7% value rise, but a 4% volume drop. A 3.2% compound annual growth rate in volume of output is anticipated in the next 5 years.

Cement, Concrete, Aggregates—1979 Values
(in billion dollars)

Hydraulic cement	$ 3.91
Crushed stone	2.81
Sand and gravel	2.50
Concrete	12.88
	$22.10

Cement Consumption—by PCA Region
(in million short tons)

Region	1975	1976	1977	1978	1979	1980 (estimate)
Eastern	12.687	12.161	12.560	14.007	13.987	12.60
Great Lakes-Midwestern	12.420	13.454	14.066	14.771	14.196	13.24
Southeastern	10.142	10.776	12.161	13.682	13.146	12.25
North Central	4.787	5.217	5.266	5.364	5.925	5.04
Rocky Mountain-Northwest	5.161	5.886	6.363	6.848	7.111	6.73
Pacific-Southwest	8.747	9.123	10.720	11.363	12.376	10.82
South Central	13.081	14.082	15.952	17.215	17.172	15.30
Total	67.025	70.699	77.088	83.250	83.286	75.98

Source: "U.S. Cement Consumption Forecast," Portland Cement Association, April 1980 (does not include Puerto Rico)

Corporate re-alignments

A number of cement and construction minerals companies were acquired by, or merged with, U.S. conglomerates or foreign interests in the past 18 months. Genstar, Inc., headquartered in Montreal, Quebec, acquired The Flintkote Co. as a wholly owned subsidiary in February 1980, extending its participation in building materials, cement, and construction markets in North America. While Genstar's head office will remain in Montreal, the company has established executive offices in San Francisco. Most of the company's Canadian enterprises are in the four western provinces. Operations in the United States are concentrated in the Sun Belt states from the West Coast along the country's southern tier.

By the end of 1980, Genstar will have four cement plants operating in western Canada (one in each province) with a combined capacity of approximately 3 million short tons. The Building Materials group gives the following plant count for 1979 operations in western Canada (British Columbia, Alberta, Saskatchewan, and Manitoba): ready-mix concrete, 25; concrete block, 8; concrete pipe, 8; aggregate, 16; precast concrete, 8; gypsum wallboard, 3. A total of 36 pits and quarries were operated. Twelve asphalt plants were located in the four western provinces.

Flintkote's plant count includes four cement plants, seven lime-producing plants, six gypsum products plants, and a number of crushed stone, sand and gravel, bituminous concrete, and portland cement concrete plants. The company also produces roofing products, floor tile, paperboard, and insulation board products. Other activities include contract and construction services.

Record revenues were produced by Genstar's Building Materials group in 1979. The company feels that the outlook for 1980 is favorable and that the diversity of company activities should cushion the effects of a downturn in residential housing starts. The Genstar annual report notes, however, that all indicators point to little real growth in the U.S. or Canadian economies in 1980; expectations are that no measurable improvement will take place before the latter half of the year.

Gifford-Hill & Co., Inc. acquired Amcord, Inc. in December 1979. Gifford-Hill has planned its geographical growth to serve the rapidly expanding markets of the Sun Belt states. Almost all of G-H's Construction Materials plant locations are concentrated within these states. Before purchase of Amcord, Inc., G-H operated two cement plants—one in Texas, the other in South Carolina. The purchase of Amcord late in 1979 added five cement plants located in California, Arizona, Michigan, and Pennsylvania. G-H plans to sell the Michigan and Pennsylvania facilities. After divestment of the plants, G-H will have approximately 4 million tons of annual capacity in the Sun Belt.

Aggregates (sand, gravel, crushed stone, slag) are produced by G-H from 10 plants located in Texas, five plants in Louisiana, and two plants in Arkansas. Asphalt is produced at two aggregate plants. Fly ash is obtained from power plants in Cason, Tex. and Gentry, Ark. The company

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operates 22 ready-mixed concrete plants in Texas and Louisiana, seven concrete pipe plants in Texas, and one in Louisiana. Concrete chemicals are manufactured in three plants located in North Carolina, Texas, and Utah. Late in 1979 and early in 1980, Gifford-Hill sold its prestress operations in North Carolina and Georgia and is out of this business.

The Construction Materials group again posted record revenues and earnings from operations in 1979. G-H notes that, in terms of construction activity, the Sun Belt continues to outpace the nation by a significant margin. The company feels this performance should be maintained in 1980 even though the national economy slips into recession.

In line with intentions to strengthen activities in cement, aggregates, and related products, Lone Star Industries, Inc. has increased its acquisitions and joint venture programs. In June 1979, Lone Star purchased the outstanding stock of San-Vel Concrete Corp., a Massachusetts manufacturer of precast/prestressed concrete products. Portland Cement Company of Utah was acquired in September 1979. In December 1979, Lone Star agreed to acquire the Dixon, Ill. cement plant of Medusa Corp., a subsidiary of Crane Co. In February 1980, Lone Star and OKC Corp. reached an agreement for sale of OKC's Pryor, Okla. cement facility. In April 1979, Lone Star and France's Lafarge cement group combined their cement operations in Brazil to form a new joint venture.

During 1979, Lone Star sold its Building Centers operations. These operations included wholesale lumber, distribution facilities, combination retail/contractor building materials outlets, and retail home care centers. Although the Building Centers operations were profitable, the company felt that the increasing capital requirements in both the building centers and the cement/aggregate/concrete industries made it necessary to choose between them to maintain growth and leadership. After reviewing the current and prospective return on investment in both businesses, the company decided the outlook favored cement, aggregates, and related products where strong market conditions are seen for some time to come.

Lone Star claimed the position of being No. 1 U.S. producer of cement, sand, and gravel in 1979. Last year, the company mined, processed, and sold 38 million tons of aggregates from 43 major sand and gravel deposits and stone quarries in 8 states. The company also produced and marketed 4 million cu. yd. of ready-mix and 35 million concrete block in 1979.

Domestic operations include 11 cement plants with an annual rated capacity of 7.313 million short tons; 43 aggregate plants and quarries; 55 ready-mix plants; 12 concrete block plants; 2 concrete pipe plants; 3 prestressed concrete plants; and 2 precast concrete plants.

The annual report optimistically states: "The outlook for Lone Star in 1980—despite varying forecasts for the U.S. economy—is for another year of growth in sales and earnings." The company's income from continuing operations in 1979 was a record $56 million, 84.2% above the previous record level of $30.4 million established in 1978.

To balance its varied business activities and increase its participation in the fast-growing Sun Belt area, as the Dravo Corp. annual report notes, the company merged with Southern Industries in June 1979. Southern Industries operates throughout the Gulf Coast region from Florida to Texas. Its products include lime, shell, sand and gravel, slag, and construction materials. According to Dravo, Southern Industries' lime production, together with Dravo's Maysville, Ky. lime operation, makes Dravo the second largest producer of lime in the United States.

In 1979, the National Gypsum Co. divested itself of its Bronx, N.Y. gypsum plant, its Gibsonburg, Ohio lime plant, and its cement operations, since these do not fit in with the company's long-range corporate objectives. The cement division was sold to General Dynamics Corp. The division includes mills in Alpena, Mich. and Evansville, Pa., and related storage and distribution facilities.

National Gypsum says it believes housing and construction will be strong markets in the decade of the 1980's, and plans are being put in place to enable the company to take full advantage of the opportunities. Particular emphasis is being placed on consumer-oriented products and on greater participation in the repair and remodeling markets, residential and nonresidential. Each of these markets, the company estimates, should be in excess of $40 billion in 1980 and continue to grow each year. However, planning does not limit projected growth and diversification to the construction markets.

Moore McCormack Resources, Inc., a Stamford, Conn. steamship and mine management corporation, acquired Florida Mining and Materials Corp. in 1979. Florida Mining's activities include pro-

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(continued from page 138)

duction of cement, aggregates, ready-mixed concrete, concrete block, and precast/prestressed concrete.

The Koppers Co., Inc. increased its holdings in 1979 with acquisition of the Ivy Corp. of Atlanta, Ga., and The McMichael Corp. Ivy operates six quarries in Georgia and a concrete reinforcing and accessories business with plants in Florida, Georgia, and Texas. McMichael operates two quarries, a concrete sand plant, and ready-mixed concrete and bituminous concrete plants—all in the Tulsa, Okla. area.

Foreign investors continue to enter the U.S. cement industry (see PIT & QUARRY, January 1980, p. 89, "Recent foreign acquisitions of U.S. cement companies"). As noted, the Genstar/Flintkote merger was completed in February 1980. United States Steel is selling its Universal Atlas Cement Division to Heidelberger Zement A.G. of West Germany. The San Antonio Portland Cement Co., with a 470,000-tpy wet process plant in San Antonio, Tex., was acquired last year as a joint venture by Presa S.P.A. Cementeria di Robilante of Italy and Cementwerke Vigier A.G. of Switzerland. River Cement Corp., subsidiary of Missouri Pacific Corp., sold its Festus, Mo. dry process plant in 1979 to IFI International S.A., a European holding company based in Turin, Italy. OKC Corp. is selling its Louisiana cement division to the Swedish concern, Cementa, which is a unit of Euroc, a European holding company. According to the Portland Cement Association, about 20% of U.S. capacity is foreign-owned.

Divestitures, required by the government, and a bankruptcy also have changed the cement industry's corporate configuration in the past year. To meet the requirements of an agreement with the Federal Trade Commission, Medusa Corp. is selling its Dixon, Ill. cement plant. As noted, the purchaser is Lone Star Industries.

Penn-Dixie Industries Inc., in April of this year, filed for protection under Chapter 11 of the Federal Bankruptcy Act. Under Chapter 11, the company continues to operate but seeks court protection from creditor lawsuits while it tries to work out a plan for settling its debts.

Penn-Dixie's cement division operates plants in Nazareth, Pa.; Richard City, Tenn.; Kingsport, Tenn.; West Des Moines, Iowa; West Winfield, Pa.; and Petoskey, Mich. The company has agreed to sell its Nazareth plant to Coplay Cement Co., which is based in Nazareth. Coplay is a subsidiary of the French corporation, Societe des Ciments Francais.

First quarter reports

Traditionally, interim financial reports for the first three months of the year show low sales for cement, concrete, and construction minerals. The blame generally is attributed to winter weather conditions. But this year's reports note an unusually mild season so, in many areas, the normal weather-related slowdown did not develop.

Because construction was able to continue and due to price increases, a number of cement companies reported high, even record, net sales for the first quarter of 1980. The outlook for the balance of the year was described as "cloudy" in the reports. General Portland, in announcing that its performance in the first quarter was the best first quarter performance in the company's history, went on to say: "The improvement in the first quarter should not be taken as being representative of what the company's full-year performance will be. New starts in home-building have already dropped dramatically, and we may soon feel the same trend in other areas of construction. As a result, we continue to expect that cement consumption and our profits will decline during 1980."

United State Gypsum, in its first quarter report for the three months ended March 31, 1980, announced a net sales record for the quarter. Net sales increased 5.8% over the corresponding period in 1979, but net earnings declined 20%. Here's U.S.G.'s explanation: "While sales were higher for the quarter, and earnings held up well in January and February, the impact of the high cost of money and the reluctance of mortgage-lending institutions to make forward commitments had a significant adverse influence on March results. In addition, recent price increases were not sufficient to recover fully the higher costs of energy, raw materials, and labor."

Financial reports roundup

Sales revenues and percents of total company sales for the cement, concrete, and construction segments of 60 companies are listed in this survey of 1979 annual reports. Brief descriptions of the companies' major lines of business are given.

ALPHA PORTLAND INDUSTRIES, INC.

Cement & aggregates—net sales

	in millions	% of total sales
1979	$101.904	42 %
1978	88.421	39.3
1977	75.811	37.4
1976	71.498	31
1975	55.417	31.4

Lines of business—production and sale of portland cement and construction aggregates from six cement and two aggregate plants; heavy construction, including tunnel construction, pile driving, and subsurface construction; and mechanical contracting.

The annual report notes that cement shipments were at a record high in 1979. Revenues were 15% higher in 1979 compared with 1978, and costs and expenses were about 11% greater in 1979 than in 1978.

AMERICAN AGGREGATES CORP.

(year ended March 31)

Aggregate business—net sales

	In millions	% of total sales
1979	$52.388	89.7%
1978	41.013	89.9
1977	31.217	85.

Lines of business—the corporation is engaged primarily in the business of mining, processing, and selling sand and gravel and in processing and selling blast furnace slag for road aggregate and other commercial uses. Its consolidated subsidiaries are engaged in hydraulic dredging of inland waterways and in the manufacturing and sale of precast concrete products and prestressed concrete building units. Total net sales for the fiscal year ended March 31, 1980, amounted to $65.880 million, up 13% over the $58.420 million of fiscal 1979.

ARMCO INC.

Mineral resources—net sales

	In millions	% of total sales
1979	$78.3	1.6%
1978	83.4	1.9
1977	62.8	1.8
1976	97.5	3.1
1975	69.8	2.3

Lines of business—oil field equipment and production; fabricated metal products; carbon steel products; specialty steel products; mineral resources (coal, iron ore, limestone, lime); industrial products and services; and financial services. Limestone mining and lime production are conducted at the Black River Mining Co. quarry and plant at Carntown, Ky.

ARUNDEL CORP., THE

Construction materials—net sales

	In millions	% of total sales
1979	$41.240	49.2%
1978	34.041	43.6
1977	31.091	53.1
1976	27.025	50.8
1975	25.417	61.8

Lines of business—construction materials production (sand, gravel, stone, blast furnace slag aggregates, ready-mixed concrete, prestressed/precast concrete; brick); construction; and real estate.

ASARCO INC.

Lines of business—production of nonferrous metals, including silver, copper, lead, zinc; production of nonmetallic minerals, including asbestos, coal, ilmenite, and limestone; smelting of nonferrous metal ores; scrap metal recycling; specialty chemical production; solar energy systems; and asbestos-cement pipe manufacture.

American Limestone Co., a division of Asarco, markets in seven states, mostly in the Southeast, the products from five stone quarries, two sand and gravel plants, one transit-mix concrete plant, and three limestone plants which process the by-product limestone from Asarco's Tennessee zinc mines.

BETHLEHEM STEEL CORP.

Lines of business—Bethlehem is an integrated steel producer engaged primarily in the manufacture and sale of steel and steel products. It is the second largest steel producer in the United States. The company also engages in marine construction, including the building and repairing of ships and the building of mobile offshore oil drilling platforms and in the manufacture of plastic products.

Incidental to its steel business, Bethlehem is engaged in the mining of ore and coal and the quarrying of limestone chiefly for its own use; the transportation of ore, coal, and limestone on the Great Lakes, and of bulk commodities between foreign ports and the United States; and the operation of short line railroads in the vicinities of certain of its plants.

Mineral products include iron ore, manganese ore, metallurgical and industrial bituminous coal, anthracite, lime, metallurgical, commercial, and agricultural limestone, slag, mineral wool, asphaltic concrete, copper concentrates, bentonite, and rutile. In 1979, 674 million tons of limestone were produced.

BLOUNT, INC.

(fiscal year ended Feb. 28)

Construction segment—sales & revenues

	In millions	% of total sales
1979	$322.774	75.7%
1978	295.225	78.1
1977	267.249	80.3
1976	270.772	83.1
1975	285.474	84.9

As noted in the first quarter report, for the 12-month period ended March 31, 1980, net sales for construction materials amounted to $319.542 million, compared with $298.662 million for the 1979 period.

Lines of business—construction and agribusiness products and services. The aggregate division of the construction segment mines and processes sand, gravel, and limestone at four locations in Michigan.

CALIFORNIA PORTLAND CEMENT CO.

(year ended April 30)

Cement Division—revenues

	In millions	% of total revenues
1979	$152.4	76.6%
1978	122.8	82.5
1977	92	82
1976	70.6	74.7
1975	58.8	70.5

Concrete & Stone Products Division—revenues

	In millions	% of total revenues
1979	**$ 38.8**	**19.5%**
1978	**22.8**	**15.3**
1977	**19.4**	**17.3**
1976	**21.6**	**22.8**
1975	**22.7**	**27.2**

Lines of business—portland cement, coal, prestressed/precast concrete products, ready-mixed concrete, aggregates, limestone, oil, and natural gas.

The company operates two cement plants in southern California and one in Arizona. Combined annual capacity is 3 million tons. The cement division recorded new highs in both revenues and income for the third successive year.

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CANADA CEMENT LAFARGE LTD.

Sales

	In millions
1979	$618.3
1978	535.3
1977	439.7
1976	384.8
1975	398.9

Lines of business—cement, aggregates, ready-mixed concrete, precast/prestressed concrete, concrete block, concrete pipe, asphalt, and construction.

In Canada, the company operates nine cement manufacturing plants having a rated capacity of 5.3 million metric tons. Citadel Cement Corp., a subsidiary, operates two cement plants in Alabama that have a rated capacity of about 1 million tpy. Other construction minerals operations are located in Canada.

CECO CORP., THE

Concrete forming services & products—net sales

	In millions	% of total sales
1979	$103.5	24.7%
1978	82.2	24.1
1977	63.2	23.7
1976	62.9	25.3
1975	71.7	27.7

Lines of business—concrete forming services and products (installation of forming work for concrete buildings; manufacture of concrete pipe, block, and prestressed concrete sections); steel mill products; fabricated building products; and door products.

CONROCK CO.

Total revenues

	In millions
1979	$139.358
1978	111.684
1977	97.730
1976	81.745
1975	72.927

Lines of business—the company is engaged in multi-unit aggregate and ready-mixed concrete operations in southern California. Products include rock, sand, and gravel for concrete aggregates; rock, sand, and gravel for special commercial uses; ready-mixed concrete; sand for plastering, gunite, and masonry; crushed rock for streets, highways, and asphaltic concrete; road construction base; rock dust for streets, highways, and asphaltic concrete; cobbles for river work and flood control work; ballast for railroads; asphaltic slurry sealcoat mixes; and nursery sands for golf courses and landscaping.

CONTINENTAL MATERIALS CORP.

Minerals and mineral products—revenues

	In millions	% of total revenues
1979	$13.173	40.6%
1978	10.644	39.3
1977	7.940	34.2
1976	5.179	29.7
1975	4.319	31.6

Lines of business—minerals and mineral products segment: production of sand, gravel, limestone, ready-mixed concrete, copper ore. Building components and supply segment: manufacture of heating, cooling, and ventilation equipment and of hollow metal doors.

DENISON MINES LTD.

(corporate headquarters:
Toronto, Ontario, Canada)

Cement & cement products*—sales

	In millions	% of total sales
1979	$88.32	28.4%
1978	78.36	29
1977	64.64	32.5
1976	54.85	34.3

Minerals (uranium, limestone products, oil & gas)—sales

	In millions	% of total sales
1979	$222.19	71.6%
1978	191.53	71
1977	134.42	61.5

Lines of business—production of uranium, oil, gas, potash, coal, cement, limestone, lime, kaolin, silica sand, feldspar, etc. Construction minerals subsidiaries include Lake Ontario Cement Ltd.; Aetna Cement Corp.; Primeau Argo Block Co. Ltd.; Rochester Portland Cement Corp.; and Reiss Lime Co. of Canada, Ltd.

DRAVO CORP.

Natural resources segment—revenues

	In millions	% of total revenues
1979	$214.5	21.6%
1978	164.1	17.1
1977	130.6	13.8
1976	107.9	13.3
1975	92.7	11.3

Lines of business—Dravo operates within five segments: engineering construction, manufacturing, natural resources, equipment, and transportation. The natural resources segment is carried out by two units—the Pittsburgh, Pa.-based Natural Resources Group and Southern Industries Corp., headquartered in Mobile, Ala. Southern Industries merged with Dravo in June 1979.

The Natural Resources Group's products include sand, gravel, lime, limestone, ready-mixed concrete, concrete block, coal, and power plant scrubber sludge stabilizer. Southern Industries produces shell, sand, gravel, slag, stone, ready-mixed concrete, asphaltic concrete, concrete block, lime, poultry feed supplement, and filler material for industrial rubber products.

ENGELHARD MINERALS & CHEMICAL CORP.

Nonmetallic minerals—revenues

	In millions	% of total revenues
1979	$177.0	1 %
1978	155.4	1.5
1977	130.9	1.8
1976	107.4	1.6
1975	80.9	1.4

Lines of business—marketing of ferrous and nonferrous minerals and metals, ferro-alloys, crude oil and oil products, fertilizers, petrochemicals, sugar, grains and other raw materials; refining of precious metals and manufacturing of products containing precious metals; mining and processing of nonmetallic minerals, including kaolin, attapulgite, bauxite, and talc.

FLORIDA ROCK INDUSTRIES, INC.

(year ended September 30)

Construction aggregates—net sales

	In millions	% of total sales
1979	$52.631	32.2%
1978	37.176	30.9
1977	26.565	28.1
1976	18.825	22.7
1975	20.875	24

Concrete products—net sales

	In millions	% of total sales
1979	$88.995	54.4%
1978	65.224	54.1
1977	53.196	56.3
1976	51.188	61.8
1975	53.419	61.5

Lines of business—the company has three major segments: construction aggregates, concrete products, and transportation. All operate within the United States. The construction aggregates segment principally produces and sells sand and crushed stone. The concrete products segment manufactures and markets ready mixed concrete and concrete block and markets other building materials. The transportation segment is operated through a wholly owned subsidiary which is an ICC carrier engaged in hauling liquid and dry bulk commodities.

**See Lake Ontario Cement Ltd. data capsule.*

GENERAL DYNAMICS CORP.

Material Service and Resources Group—net sales

	In millions	% of total sales
1979	$577	14.2%
1978	471	14.7
1977	437	15.1
1976	421	16.5
1975	355	16.4

Lines of business—military and commercial aircraft; missiles and space systems; commercial ships; building minerals and products; telecommunications and data products, etc.

The building materials and resources group includes these company segments: Material Service Corp. (stone, sand, gravel, ready-mixed concrete, concrete pipe); Marblehead Lime Co. (high-calcium lime, dolomitic lime); Freeman United Coal Mining Co.; and Asbestos Corp. Ltd.

Early this year, General Dynamics entered into an agreement in principle to purchase the cement division of the National Gypsum Co. The cement division includes mills at Alpena, Mich., with a 2.5 million tpy capacity, a 935,000 tpy facility at Evansville, Pa., and related storage and distribution facilities. Record sales in 1979 were reported for Material Service and Marblehead Lime.

GENERAL PORTLAND INC.

Cement & related products—net sales

	In millions	% of total sales
1979	$274.3*	99 %
1978	240.1*	97.6
1977	197.6	99.5
1976	180.6	99.8
1975	173.5	99.5

***Net sales—by product (percent)**

	197S	1978
Cement	86%	85%
Ready-mixed concrete	7	7
Aggregate	5	4
Fly ash	1	1
Total cement & related products	99	97
Real estate	1	3
Total net sales	100%	100%

Lines of business—General Portland operates eight cement plants, two each in Texas and Florida, and one each in Ohio, Tennessee, Kansas, and California. A ninth plant is under construction in central Texas. The company also markets construction aggregates in Texas and Louisiana, fly ash in Texas, and ready-mixed concrete in the Dallas/Fort Worth area. Real estate activities are conducted in Texas.

GENERAL SHALE PRODUCTS CORP.

Net sales

	In millions
1979	$61.751
1978	66.630
1977	54.120
1976	45.352
1975	36.440

Lines of business—face brick, concrete block, ready-mixed concrete, masonry and concrete sand, and burned lightweight aggregate. The company operates 24 plants in seven states (Alabama, Arkansas, Georgia, Indiana, Kentucky, Tennessee, and Virginia).

GENSTAR LIMITED

Building materials (does not include cement; see below)—revenues

	In millions of Canadian dollars	% of total revenues
1979	$288.6	22.8%
1978	250.7	21.9
1977	239.5	24.4
1976	222.4	27.1
1975	192.3	28.1

Cement—revenues

	In millions of Canadian dollars	% of total revenues
1979	$179	14.2%
1978	158	13.8
1977	133.6	13.6
1976	127.9	15.6
1975	111.4	16.3

Lines of business—cement; building materials (ready-mixed concrete, concrete block, concrete pipe, sand, gravel, classified aggregates, lightweight aggregates, precast concrete structural and architectural components, precast concrete railway ties, gypsum wallboard, resources recovered from solid waste, and construction asphalt); housing and land development; construction; marine activities; and financial services and investments.

(**Note**: The Flintkote Co. became a wholly owned subsidiary of Genstar in February 1980. Genstar had acquired a 21.5% interest in Flintkote during 1978. Flintkote's lines of business are outlined in the corporate re-alignment section of this report. For Flintkote's net sales data for 1974-8, see Pit & Quarry, July 1979, pages 162, 164)

GEORGIA-PACIFIC CORP.

Gypsum—net sales

	In million	% of total sales
1979	$229	4%
1978	203	5
1977	160	4
1976	117	4
1975	95	4

Lines of business—building products, including plywood and specialties, lumber, gypsum, roofing, metal products, etc.; pulp, paper, and paperboard; chemical and plastic products; furniture; stationery products; and industrial gypsum, etc.

GIANT PORTLAND & MASONRY CEMENT CO.

Net sales

	In millions
1979	$30.212
1978	28.284
1977	20.428
1976	18.348
1975	17.688

Lines of business—production of portland and masonry cements at 855,000-tpy plant in South Carolina.

GIFFORD-HILL & CO., INC.

Construction materials—net sales

	In millions	% of total sales
1979*	$221.275**	54.6%
1978*	195.047	57.3
1977	157.616	53.8
1976	128.524	48.5
1975	124.495	53.9

***Net sales—by product segments**

	In millions 1979	1978
Cement	$ 52.158	$ 43.280
Concrete	80.178	72.009
Aggregates	40.891	33.036
Concrete Pipe	34.041	33.785
Prestress***	14.007	12.937
Total	$221.275	$195.047

***Gifford-Hill acquired Amcord, Inc. in December 1979. Since acquisition of Amcord occurred late in the year, their results are not included here.*

****Prestress operations sold in late 1979 and early 1980.*

Lines of business—construction materials, metal building products, irrigation products, and transportation, all operated within the United States. Construction materials include cement, sand, gravel, crushed stone, slag, fly ash, ready-mixed concrete, prestressed/precast concrete members, concrete pipe, concrete chemicals, asphalt, and fly ash.

GULF + WESTERN INDUSTRIES, INC.

(year ended July 31)

Building products—net sales

	In millions	% of total sales
1979	$136	2.57%
1978	108	2.51
1977	89	2.44

Cement—net sales

	In millions	% of total sales
1979	$148	2.80%
1978	140	3.25
1977	123	3.37

Lines of business—Gulf + Western activities are reported in the following business segments: leisure time; consumer and agricultural products; manufacturing; apparel products; automotive replacement parts; paper and building products; natural resources; and financial services. Main products of the Natural Resources group are portland and masonry cement, zinc metal and zinc pigments, titanium dioxide and other chemicals, and metallurgical coal. Cement operations are conducted by G + W's Marquette Co., operating 10 plants in nine states.

The Paper and Building Products Group's products include pulp, paper, and paperboard; towels, tissues, and food service disposables; folding cartons; matches; and building products. The building products segment encompasses aggregates (rock, sand, and gravel), ready-mixed concrete, and concrete-forming equipment and accessories.

IDEAL BASIC INDUSTRIES, INC.

Cement Division—sales & operating revenues

	In millions	% of total sales & operating revenues
1979	$355.351	81.6%
1978	349.627	85.3
1977	288.848	83.7
1976	243.365	82
1975	214.841	80

Lines of business—production of portland cement; mining and concentration of potash. The company operates 13 gray cement plants and one white cement plant. Total annual capacity is currently rated at 6.48 million tons of cement. The cement division also operates a sand and gravel plant in south Texas and a limestone quarry in British Columbia.

INDIANA LIMESTONE CO., INC.

(year ended Nov. 30)

Net sales

	In millions
1979	$5.115
1978	5.265
1977	4.063
1976	5.167
1975	3.094

Lines of business—the company quarries and fabricates Indiana limestone for use as a building material. By-product stone is sold for breakwater and shoreline protection in the Great Lakes area. The percentages of dollar sales of the various limestone products in 1979 are block stone (raw material), 13%; sawed stone (semi-finished), 16%; cut stone (finished), 62%; breakwater, 5%; other, 4%.

INLAND STEEL CO.

Lines of business—the company has operations in four business segments: integrated steel, steel service centers, steel-related operations, and shelter. Integrated steel operations include the manufacture and sale of steel mill products, and the mining, quarrying, and processing of iron ore, coal, and limestone used in steel-making. The limestone and dolomite properties of the company are located in the Upper Peninsula of Michigan. A wide range of stone products is produced at the rate of approximately 3.4 million gross tons per year.

IU INTERNATIONAL CORP.

Industrial products & services—revenues

	In millions	% of total revenues
1979	$284.550	10.7%
1978	242.257	9.9
1977	224.118	10.5
1976	177.068	9.7
1975	222.512	13.2

Lines of business—principal segments are land transportation; utility services; industrial products and services; distribution services; agribusiness; and other operations (silver mining, telephone answering services, real estate development, etc.). The industrial products and services group includes International Mill Service; IU Conversion Systems, Inc.; G. & W. H. Corson, Inc.; Southwest Fabricating & Welding Co.; and Hills-McCanna Co. International Mill Service processes slag and reclaims scrap metals for steel mills in 16 countries. IU Conversion Systems designs, engineers, constructs, and operates facilities that convert pollutants from coal-fired power plants and other industrial wastes into stable materials for landfill and other uses. Corson quarries limestone and produces lime for metallurgical and construction markets, pollution control, and other applications. Southwest Fabricating is a leading pipe fabricator serving the power and processing industries. Hills-McCanna makes valves for industrial uses.

INTERPACE CORP.

Concrete pipe—net sales

	In millions	% of total sales
1979	$ 81.9	25%
1978	91.4	31
1977	81.8	44
1976	102.1	53
1975	119.5	59

Lines of business—construction and building products, including porcelain insulators; pumps; concrete pipe; heating, ventilating, air conditioning, and plumbing products; and structural brick.

JEFFERSON CORP.

(for fiscal year ended March 31)

Concrete & adhesive operations—net sales

	In millions	% of net sales Concrete operations	% of net sales Adhesive operations
1979	$19.03	77.5%	22.5%
1978	16.58	70.4	29.6
1977	17.82	75.4	24.6
1976	21.15	82.9	17.1
1975	21.38	87	13

(For the 12 months ended December 31, the 1979 net sales totaled $22.63 million; 1978 sales amounted to $18.31 million.)

Lines of business—concrete operations (consisting of production of ready-mixed concrete, precast/prestressed concrete, sand, gravel); adhesive operations (manufacture, sale, and application of adhesives, coatings, and binders for use in concrete construction); and life and health insurance.

The next 10 years: excerpts from "A Year of Bold Action and Record Profit"

Lone Star Industries, Inc.
1979 annual report

"What is civilization without cement? Each generation determines its own needs, sets it own priorities; but civilization and living standards move relentlessly forward. Construction in America, commanding some 10% of the gross national product and indirectly influencing at least another 10%, is currently supported by $230 *billion* in spending, provides employment for an estimated 10 million people, and is *absolutely dependent* on the relatively small cement and aggregates industries. Our nation's future will require more and more of these basic products, for which no economic substitutes are even remotely in sight."

"The U.S. cement industry has arrived at a new era of great promise and opportunity—an era of new dynamics:

- *pent-up demand* for safer highways, bridges and airport runways, better water and sewage treatment systems, smoother railroad track-beds and many other needs.
- *limited supply*, caused by a prolonged period of inadequate new investment in the cement industry and aggravated by an increasing number of retirements of old and inefficient plants.
- *new capital formation goals*, achievable by those companies that can generate funds internally and find innovative ways to access capital markets.
- *changing distribution patterns*, with rail and barge shipments challenging the high costs of truck hauling and ocean shipping.
- *fuel-saving technologies* to lower costs dramatically in cement manufacture through preheaters, precalciners, roller mills, and other innovations.
- *and perhaps above all, the dynamics of public opinion*, rallying against the economic effects of over-regulation and excessive environmentalism.

"How do we see the cement industry in the U.S. for the next ten years?

First—1980 will be a *good* year.

Second—From 1981 to 1986 every ton of U.S.-produced cement will be utilized in our domestic market.

Third—The worldwide squeeze on oil and energy will change world trade patterns, including cement.

Fourth—From 1981 to 1989, a great number of outdated high-Btu-using cement plants will be shut down.

Fifth—After 1990, only new plants, those which have been converted to the new technology, and only a few others, will survive."

BEST AVAILABLE COPY

JOHNS-MANVILLE CORP.

Lines of business—fiber glass products; forest products; pipe products and systems; roofing products; non-fiber glass insulations; asbestos fiber; and industrial and specialty products and services. J-M mines asbestos fiber, diatomaceous earth, and perlite. Perlite is used in industrial roof insulations, asbestos in asbestos-cement pipe, roofing, friction materials, and specialty products; diatomite in filter aids and fillers. Total revenues were $2.297 billion in 1979 and $1.677 billion in 1978.

JUSTIN INDUSTRIES, INC.

Building materials—net sales

	In millions	% of total sales
1979	$131.060	71%
1978	127.543	75
1977	105.610	73
1976	64.268	65
1975	39.987	58

Lines of business—building materials (brick, precast and prestressed concrete, concrete block, lightweight aggregate, and architectural stone); manufacture of boots, belts, and other leather goods; fabrication of ceramic cooling towers; and publishing. Building material plants are located in Arkansas, Kansas, Kentucky, Louisiana, North Carolina, Oklahoma, Tennessee, and Texas.

KAISER ALUMINUM & CHEMICAL CORP.

Refractories Division—net sales

	In millions	% of total sales
1979	$197.4	6.8%
1978	180.3	7.3
1977	152.8	6.8
1976	134.4	7.3
1975	124.2	7.9

Lines of business—the corporation operates principally in six business segments: aluminum, agricultural chemicals, industrial chemicals, refractories, trading, and real estate. The refractories group includes production of agricultural dolomite; architectural and landscaping dolomite sand and stone; refractory brick and specialties; deadburned dolomite; clay/alumina brick and specialties; fireclay; insulating refractories; magnesium hydroxide; periclase/magnesite; and silica refractories.

KAISER CEMENT CORP.

Cement & clinker—net sales & operating revenue

	In millions	% of total revenues
1979	$238.180	91.76%
1978	209.169	91.73
1977	160.751	90.59

Concrete, aggregates, & other—net sales & operating revenue

	In millions	% of total revenues
1979	$21.397	8.24%
1978	18.859	8.27
1977	16.701	9.41

Lines of business—cement, ready-mixed concrete, sand, gravel, crushed rock, coal, and natural gas.

Kaiser's five cement plants in the United States are located in California, Texas, Hawaii, and Montana, and have a rated annual capacity of 4.23 million short tons. Three aggregate plants, with a total rated annual capacity of 5.4 million short tons, are located in California, Washington, and Texas. Ready-mixed concrete plants are located in Seattle, Wash. (200,000 cu. yd., annual capacity), Tacoma, Wash. (200,000 cu. yd.), and Austin, Tex. where two plants produce a combined annual capacity of 300,000 cu. yd.

KEYSTONE PORTLAND CEMENT CO.

Sales, less discounts

	In millions
1979	$22.436
1978	21.097
1977	16.674
1976	15.737
1975	15.192

Lines of business—the company produces portland and masonry cement at its plant in Bath, Pa. Crushed limestone is supplied by an operating division. Another operating division mines bituminous coal for use in fueling the cement kilns.

KOPPERS CO., INC.

Road Materials Group—net sales

	In millions	% of total sales
1979	$454.1	24.8%
1978	304.1	19.2
1977	174.1	12.8
1976	134.7	11.3
1975	111.8	10.4

Lines of business—organic materials (phthalic anhydride, creosote, alkyd resins, etc.); road materials (sand, gravel, granite, limestone, trap rock, sandstone, slag, ready-mixed concrete, bituminous concrete, and steel wire mesh); forest products (lumber); engineered metal products; and engineering and construction.

Aggregate pits and quarries in the Road Materials group are located in California, Georgia, Indiana, Kansas, Kentucky, New York, Ohio, Oklahoma, Pennsylvania, Tennessee, and Virginia. Six facilities in the Southeast and Southwest produce and distribute welded wire fabric and other concrete-reinforcing and forming accessories. More than 90% of sales of the Road Materials group are from aggregates (crushed stone, sand, gravel, and slag), bituminous concrete, ready-mixed concrete, and paving services. The balance is from bituminous paving materials (road asphalt and asphalt emulsions) and from steel wire mesh.

LAKE ONTARIO CEMENT LTD (CANADA)

Sales

	In millions
1979	$88.317
1978	78.364
1977	64.641
1976	54.845
1975	41.833

Lines of business—cement milling and production in Ontario (Canada), western New York state and Michigan; ready-mixed concrete, concrete block and brick, and aggregate businesses in Ontario.

Lake Ontario Cement manufactures clinker and cement at its Picton, Ont. plant and grinds clinker into cement through its Michigan subsidiary, Aetna Cement Corp. Cement is sold in Ontario, western New York state and Michigan. The Premier Concrete Products Division has ready-mixed concrete operations at Windsor, Toronto, Hamilton, Oshawa and Ottawa, a concrete block plant at Windsor, and an aggregate facility at Alton, Ont. On January 7, 1980, the company acquired the minority interest of its subsidiary company, Primeau Argo Block Co. Ltd. This subsidiary manufactures concrete block and concrete brick in three plants in the metropolitan Toronto area.

LONE STAR INDUSTRIES, INC.

Cement—net sales (domestic)

	In millions	% of total sales
1979	$290	36.6%
1978	241.5	37.9
1977	185	40.6
1976	143.4	36.3
1975	121.4	33.1

Construction aggregates—net sales

	In millions	% of total sales
1979	$127.2	16.1%
1978	105	16.5
1977	75.8	16.7
1976	71	18
1975	69.8	19

Concrete & concrete products—net sales (domestic)

	In millions	% of total sales
1979	$201.5	25.4%
1978	147.1	23.1
1977	85.2	18.7
1976	71.5	18.1
1975	70.6	19.2

Lines of business—cement and related products, which include the production and distribution of portland, masonry, and other types of cement, and the manufacture and distribution of ready-mixed concrete and concrete products; mining, processing, and distribution of sand, gravel, and crushed stone; real estate operations, wholesale lumber operations, and the sale of other construction materials.

LOUISVILLE CEMENT CO.

Sales, less discounts

	In millions
1979	$90.022
1978	75.607
1977	70.799
1976	69.747
1975	63.179

Lines of business—Louisville Cement Co. is engaged in the manufacture and sale of portland and other types of cements. The company operates three cement plants. Two are located in Indiana and one in Pennsylvania, with a combined annual capacity of 2.2 million tons. The company markets its products in 13 states extending from the Midwest to the South Central states along the East Coast. Its products are distributed through a network of nine terminals and warehouses in addition to the three plants.

MARTIN MARIETTA CORP.

Cement—net sales

	In millions	% of total sales
1979	$197.7	9.6%
1978	181.2	10.3
1977	154.4	10.7
1976	143.7	11.9
1975	125.8	11.9

Aggregates—net sales

	In millions	% of total sales
1979	$176.9	8.6%
1978	157.7	9
1977	130.7	9.1
1976	116.1	9.6
1975	107.5	10.2

Lines of business—cement; aggregates (crushed stone, construction sand, gravel, industrial sand); chemicals; aluminum; aerospace; and investments.

Sales and contribution to earnings for Martin Marietta Cement and Martin Marietta Aggregates reached record levels in 1979. Cement shipments totaled 4.3 million tons in 1979, just about the same quantity as in 1978. Shipments of crushed stone, construction sand, gravel, and industrial sand exceeded 50 million tons, a slight decline from 1978.

The company's industrial sand operations, heretofore entirely in the Midwest, were extended to South Carolina, Texas, California, and Idaho with the acquisition of Wedron Silica Co., a producer of foundry sands and melting sands for amber and green glass. Martin Marietta's industrial sand plants have an annual capacity of approximately 4 million tons for customers primarily in the glass, foundry, ceramic, and plastics industries.

McDONOUGH CO.

(year ended January 31)

Building Materials Group—net sales

	In millions	% of total sales
1980	$84.9	18.8%
1979	73.8	17.7
1978	68.6	19.9
1977	55.6	18.2
1976	47.1	16.6

Lines of business—McDonough is a multi-product line company operating in three basic industries: building materials, footwear, and hand tools. The building materials group consists of the Gulf Coast Portland Cement and the Houston Shell & Concrete Divisions, which produce cement and ready-mixed concrete for the metropolitan Houston market; and the Ohio River Division, which produces and markets sand and gravel in central Ohio and West Virginia.

MEDUSA CORP.

(Subsidiary of Crane Co.)

Construction materials—net sales

	In millions	% of total sales
1979	$252.336	88.6%
1978	244.000	84.9
1977	216.755	89.8

Lines of business—the company has two major business segments: construction materials and construction services. The construction materials segment principally includes production and sale of cement products, stone, sand, gravel, and asphalt. The construction services segment includes highway safety construction and asphalt paving.

MICHIGAN GENERAL CORP.

Contracting group—net sales

	In millions	% of total sales
1979	$19.7	8.7%
1978	19.5	9.7
1977	15.3	8
1976	13	7.6
1975	13.8	9

Architectural concrete products

	% of Contracting Group net sales
1979	64.8%
1978	64.4
1977	71.4
1976	73.3
1975	70.9

Lines of business—Michigan General is comprised of 19 operating entities structured into five operating groups: highway safety; manufacturing; contracting; consumer products; and retailing. The contracting group manufactures concrete pipe, concrete blocks, cribbing for retaining walls, prestressed bridge beams for highway construction, precast and prestressed floor and roof systems, and other structural products. The group also produces architectural precast concrete wall panels, precast/prestressed structural components, concrete masonry units, concrete stave industrial and farm silos, and related products; provides commercial and industrial painting and decorating services; and sells paint, wall coverings, and related items.

MONOLITH PORTLAND CEMENT CO.

Portland cement—net sales

	In millions	% of total sales
1979	$49.962	83.5%
1978	32.802	79.8
1977	30.512	82.2
1976	24.920	83.7
1975	22.106	85.6

Ready-mixed concrete, asphalt, and rock aggregates—net sales

	In millions	% of total sales
1979	$9.858	16.5%
1978	8.291	20.2
1977	6.593	17.8
1976	4.869	16.3
1975	3.707	14.4

Lines of business—the company produces portland cement, ready-mixed concrete, asphalt, rock, and sand. Monolith operates a cement plant in California and one in Wyoming. Ready-mixed concrete plants are in California and Wyoming; an asphalt plant and aggregate plant are in California.

MOORE McCORMACK RESOURCES, INC.

CEMENT, CONCRETE PRODUCTS, AND AGGREGATES OPERATIONS

The company acquired Florida Mining & Materials Corp. (a cement, concrete products, and aggregates producer) on July 1, 1979. Sales and revenues for this segment for the half year amounted to $64.9 million dollars. The following tabulation for Florida Mining & Materials Corp. revenues from 1976 through 1978 is repeated from the July 1979 issue of Pit & Quarry.

FLORIDA MINING & MATERIALS CORP.

Ready-mixed concrete & concrete block—revenues

	In millions	% of total revenues
1978	$52.774	65.8%
1977	34.644	64.3
1976	26.629	64.8

Aggregates—revenues

	In millions	% of total revenues
1978	$5.409	6.8%
1977	3.563	6.6
1976	3.055	7.5

Prestressed and precast concrete—revenues

	In millions	% of total revenues
1978	$10.823	13.5%
1977	7.436	13.8
1976	6.988	17

Cement—revenues

	In millions	% of total revenues
1978	$10.031	12.5%
1977	7.317	13.6
1976	3.426	8.3

Lines of business—the principal segments of Moore McCormack Resources business are iron ore; coal; cement, concrete products and aggregates; bulk transportation; and cargo liners. The cement, aggregates, and concrete products segment includes the production of ready-mixed concrete, concrete block, portland cement, aggregates, and prestressed and architectural concrete structures (all acquired from Florida Mining & Materials Corp. in 1979), and the quarrying and processing of limestone in Ohio and Pennsylvania.

NATIONAL GYPSUM CO.

Gypsum & related products—net sales

	In millions	% of total sales
1979	$391	38.4%
1978	342	37.6
1977	267	35.7
1976	210	34.2
1975	171	32

Cement—net sales*

	In millions	% of total sales
1979	$164	16.1%
1978	145	15.9
1977	114	15.2
1976	97	15.8
1975	93	17.4

**Cement division sold to General Dynamics Corp. in 1979.*

Lines of business—gypsum and related products; wall and floor coverings; glass and metal products; specialty and other products such as tiles, exterior siding, lime, limestone, and manufactured housing.

NORTHWESTERN STATES PORTLAND CEMENT CO.

(year ended Nov. 30)

Net sales

	In millions
1979	$40.696
1978	43.097
1977	35.477
1976	29.959
1975	22.755

Lines of business—the company manufactures cement in its plant in Mason City, Iowa, and markets the product in an area encompassing parts of the states of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin.

OGLEBAY NORTON CO.

Minerals Operations—sales and revenues

	In millions	% of total revenues
1979	$19.451	10 %
1978	15.270	9.3
1977	13.653	11.9
1976	10.146	8.7
1975	6.736	6.9

Lines of business—operations cover minerals, transportation, and manufacturing. The company is engaged in the production of iron ore, coal, quartzite, silica sand, refractory and insulation materials, ferrous and non-ferrous products. Quartzite is produced by its Central Silica Co. subsidiary in two plants in Ohio. Fracture sand for oil and gas well treatment is processed in Texas by its subsidiary, Texas Mining Co. Silica flour is made at Texas and California locations. The minerals operations segment covers quartzite sand and fracture sand production, oil and gas production, and fluorspar briquette manufacture.

OREGON PORTLAND CEMENT CO.

Net sales

	In millions
1979	$52.592
1978	45.600
1977	37.089
1976	33.569
1975	26.195

Lines of business—the company operates four cement plants, three in Oregon and one in Idaho and also is a producer of agricultural and chemical limestone products. Products are marketed in Oregon, Idaho, and Washington, plus in parts of Utah, Nevada, Wyoming, and Montana.

PENN VIRGINIA CORP.

Industrial minerals—operating revenue

	In millions	% of total revenue
1979	$9.552	17.8%
1978	9.376	23.7
1977	8.724	24.1
1976	6.894	24.2
1975	6.145	34

Lines of business—coal land operations; equipment manufacturing; investments; and industrial minerals. The industrial minerals operations cover limestone production operations in New Jersey and Tennessee, lime operations in Tennessee, and fly ash pozzolan marketing in Ohio.

H. K. PORTER CO., INC.

Cement—net sales

	In millions	% of total sales
1979	$82.964	12.9%
1978	75.497	13.8
1977	39.415	8.2

Lines of business—the company operates in six principal areas: industrial products, electrical products, industrial distribution, steel, specialty metals, and cement. The cement segment started with the acquisition, in 1977, of Missouri Portland Cement Co.

PUERTO RICAN CEMENT CO., INC.

Cement and related products—net sales

	In millions	% of total sales
1979	$57.104	90.2%
1978	57.804	95.5
1977	54.016	93
1976	53.448	95.4
1975	52.573	93.7

Lines of business—cement and related products, including portland cement and hydrated lime; multiwall paper bag manufacture; and real estate development.

RANGAIRE CORP.

(fiscal year ended July 31)

Quicklime & hydrated lime—net sales

	In millions	% of total sales
1979	$17.198	21.3%
1978	16.086	21.5
1977	15.433	21.5
1976	14.784	23.1
1975	13.052	22.9

Limestone; contract mining; heavy media material—net sales

	In millions	% of total sales
1979	$ 6.831	8.5%
1978	4.988	6.7
1977	5.546	7.7
1976	4.664	7.3
1975	2.695	4.7

Lines of business—Rangaire is a diversified company engaged in mining, minerals processing, and manufacturing. The company mines limestone and produces lime in Texas, Arkansas, and Virginia; processes magnetite ore in Virginia; operates a general contracting firm in Texas; and manufactures various products, including built-in kitchen appliances, fluorescent lighting fixtures, and range hoods, freezers, etc.

ST. LAWRENCE CEMENT CO. (Canada)

Cement—net sales

	In millions	% of total sales
1979	$139	54%
1978	114	49
1977	85	43
1976	62	39
1975	62	35

Stone & building materials—net sales

	In millions	% of total sales
1979	$ 52	20%
1978	42	18
1977	43	22
1976	39	24
1975	39	22

Ready-mixed concrete—net sales

	In millions	% of total sales
1979	$ 48	19%
1978	43	19
1977	47	24
1976	47	30
1975	48	27

Lines of business—operation of cement plants, stone quarries, sand and gravel pits, ready-mixed concrete plants, concrete block plants, prestressed concrete plants, concrete pipe plants, building materials centers, fuel oil and lumber distribution centers, and asphalt plants. These activities are conducted in Quebec, Ontario, and New York.

SOUTHDOWN, INC.

Cement—revenues

	In millions	% of total revenues
1979	$172.650	79.4%
1978	144.714	63.3
1977	124.362	64.6
1976	99.078	55.4
1975	76.526	36.8

Lines of business—oil and gas production and cement manufacture. Southwestern Portland Cement Co., Southdown's cement subsidiary, operates plants in California, Ohio, and Texas.

TEXAS INDUSTRIES, INC.

(year ended May 31)

Concrete products—sales & revenues

	In millions	% of total revenues
1978	$177.2	93.4%
1977	142.1	93.6
1976	127.4	91.2
1975	108.6	89.3

(Total sales and revenues for all business segments for the 12-month period ending in February 1980, $271.925 million; 1979, $222.296 million.)

Lines of business—concrete products segment includes cement, aggregates, ready-mix, concrete block and brick, concrete pipe, prestressed concrete products, and architectural precast panels. The construction operations segment includes highway construction contracting, hot-mix asphalt paving, masonry contracting, and concrete contracting.

UNITED STATES GYPSUM CO.

Gypsum products—net sales

	In millions	% of total sales
1979	$703.347	46 %
1978	620.763	44.4
1977	480.494	40.8
1976	363.753	37.8
1975	295.687	36

Lines of business—product group sales by the company in 1979 were: gypsum products, 46%; refractories, 16%; metal products, 11%; wood fiber and mineral fiber, 10%; other products, 17%.

VULCAN MATERIALS CO.

Construction materials—net sales

	In millions	% of total sales
1979	$316.982	42%
1978	291.746	45
1977	229.130	45
1976	181.847	44
1975	165.166	46

Lines of business—Vulcan Materials is a multi-industry company operating in three basic businesses: construction aggregates production; chemicals manufacture, including chlorinated hydrocarbons and other industrial and agricultural chemicals; and production of secondary aluminum, detinned steel scrap, and tin chemicals.

In 1979, the Construction Materials group operated 91 facilities in 12 states for the production of aggregates. These aggregates consist of crushed stone (granite and limestone), slag, sand, and gravel, expanded lightweight shale, dolomitic lime, and mineral filler. Crushed stone was produced at 80 plants.

The company also operates two sand and gravel plants, four slag plants, a lime plant, an expanded lightweight shale plant, a mineral filler plant, and a pulverized limestone plant. Other products and services include ready-mixed concrete and asphaltic concrete manufacture, truck sales and service, and miscellaneous materials processing activities.

WALTER, JIM CORP.

(for year ended Aug. 31)

Mineral & Fiber Products Group—sales & revenues

	In millions	% of total revenues
1979	$664.696	34.1%
1978	597.128	34.4
1977	510.599	35.5
1976	443.340	34.5
1975	404.758	32.2

Pipe Products Group—sales & revenues

	In millions	% of total revenues
1979	$309.005	15.9%
1978	299.537	17.3
1977	243.108	16.9
1976	220.423	17.1
1975	205.197	16.3

Stone Products Group—sales & revenues

	In millions	% of total revenues
1979	$43.178	2.2%
1978	39.300	2.3
1977	36.141	2.5
1976	36.058	2.8
1975	43.300	3.5

Lines of business—homebuilding group; mineral and fiber products group (roof shingles, gypsum wallboard, vinyl siding, foam insulation, etc.); pipe products group (concrete, steel and cast iron pipe, valves, and hydrants); coal, iron, and chemicals group; metal and wood products group; stone products group (crushed and dimension stone); paper group; sugar operations; oil and gas operations; and savings and loan operations.

WHITEHALL CEMENT MANUFACTURING CO.

Sales, less discounts

	In millions
1979	$20.362
1978	21.286
1977	14.852
1976	14.235
1975	13.259

Lines of business—the company is engaged in the production and sale of portland cement. Pland and office are located in Whitehall, Pa. ●

Data Sources

- "1980 U.S. Industrial Outlook for 200 industries with projections for 1984"—U.S. Dept. of Commerce, Industry & Trade Administration (January 1980).
- "Mineral Commodity Summaries—1980" (covers 1979 mineral industry data)—Bureau of Mines, U.S. Dept. of the Interior.
- "Minerals Yearbook," Vol. I (Metals, Minerals, and Fuels), Bureau of Mines (annual).
- "Mineral Industry Surveys"—Bureau of Mines (various issuing times, depending on industry category).
- "1980 Dodge/Sweet's Construction Outlook"—McGraw-Hill Information Systems Co.
- "Construction Review," Dept. of Commerce.
- "U.S. Cement Consumption Forecast"—April 1980, Portland Cement Association.
- 1979 annual financial reports (see company capsule descriptions in this report).
- 1980 first quarter financial reports.
- *Engineering News-Record*—ENR materials prices.
- "Power plant ash—a growing raw material resource"—Sid Levine, PIT & QUARRY, April 1978.

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AND NEXT MONTH

Georgia mine reclamation recognized by proclamation.

ON THIS MONTH'S COVER

**Captive quarry opened recently by Missouri producer
to supply limestone aggregate
for bituminous concrete production. See page 72.**

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 May	1979 May	% Change
Nonresidential Building	$ 4,135.4	$ 4,440.8	– 7
Residential Building	4,494.6	8,084.3	–44
Nonbuilding Construction	2,505.0	3,723.4	–33
Total Construction	$11,135.0	$16,248.5	–31

	1980 5 mos.	1979 5 mos.	% Change
Nonresidential Building	$20,079.4	$20,112.9	—
Residential Building	21,783.0	31,349.3	–31
Nonbuilding Construction	12,489.4	22,197.4	–44
Total Construction	$54,351.8	$73,659.6	–26

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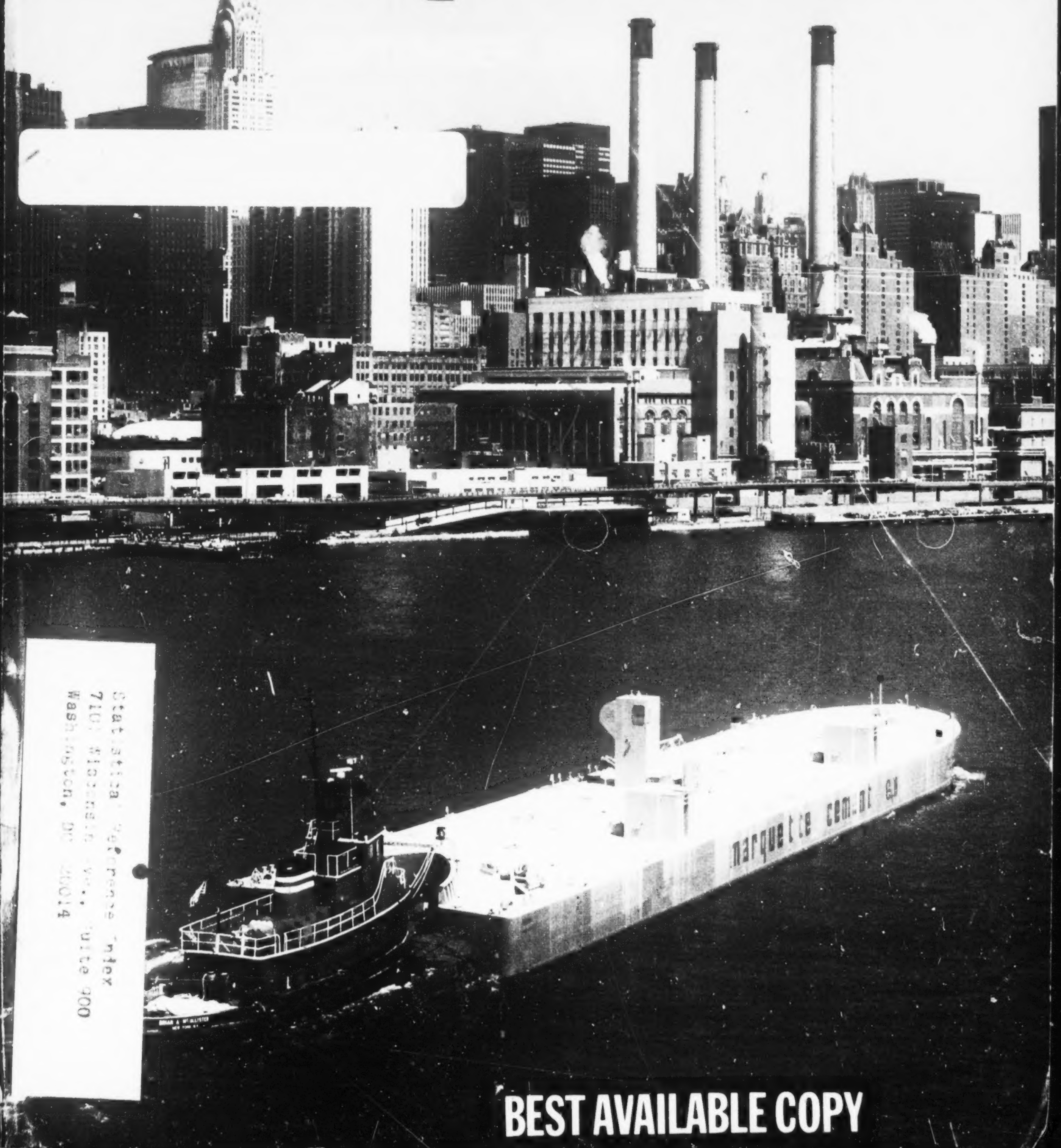
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AND NEXT MONTH

Our annual special maintenance issue will feature reports ranging from crusher upkeep to care of vehicle power trains.

ON THIS MONTH'S COVER

Marquette's new ocean-going barge rounds the southern tip of Manhattan on its maiden voyage to the firm's Flushing Bay terminal, Long Island. See page 81. Photo courtesy of Gulf + Western Industries.

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COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 June	1979 June	% Change
Nonresidential Building	$ 4,861.2	$ 4,603.6	+6
Residential Building	5,092.1	7,309.3	-30
Nonbuilding Construction	2,471.4	3,241.4	-24
Total Construction	$12,424.7	$15,154.3	-18

	1980 6 mos.	1979 6 mos.	% Change
Nonresidential Building	$24,775.7	$24,727.0	—
Residential Building	26,726.9	38,648.8	-31
Nonbuilding Construction	14,957.2	25,436.5	-41
Total Construction	$66,459.8	$88,812.3	-25

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AND NEXT MONTH

Considerations on en masse conveyor systems
Western lime plant doubles capacity to serve steel market

ON THIS MONTH'S COVER

Distribution, among a bearing's rolling elements, of an applied load is diagrammed against a backdrop of several types of the bearings that keep industry moving. For a discussion of bearing failures and the causes, see pg. 74. (Photos courtesy of SKF Industries, Inc.)

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Papers for Latin America Building/Construction Expo

Abstracts are being accepted for the technical seminar program to be held concurrently with the premiere presentation of the Latin America Building and Construction Exposition October 27-30, 1981, in Panama, Republic of Panama.

Tailored to the needs of the region, state-of-the-art presentations will be combined with thought-provoking workshops to provide a forum for open exchange of technology, concepts and product information. The final selection of topics by the Panama Contractors Association will reflect worldwide industry trends with particular application to the Latin American market.

To submit an abstract, speakers should provide the title and describe the contents of the proposed paper in 100-200 words. The deadline for abstracts is May 15, 1981, but should be mailed as soon as possible. Announcement of selected papers will be made about June 1, 1981.

Specify in which language the paper will be presented, approximate length of time needed, and describe the use of any audio-visual materials which might be needed. Also include a very brief resume, specifically mentioning association or society affiliations.

For additional information contact Harry Lepinske, director, Latin American Operations, Industrial and Scientific Conference Management, a Cahners Exposition Group Company, 222 W. Adams St., Chicago, Ill. 60606.

Florida Phosphate Operation Wins Sentinels of Safety Award

USS Agri-Chemicals' Rockland, Fla., phosphate mine has won the 1979 Sentinels of Safety Award cosponsored by the Mine Safety and Health Administration and the American Mining Congress. The award is presented for accumulating the most work-hours at a single open pit mine without an employee missing a workday due to injury. The Rockland mine recorded no lost workday injuries during a total worktime of more than 500,000 hours in 1979.

COMPARISON OF MONTHLY/YEAR-AGO CONSTRUCTION CONTRACT VALUES*

	1980 July	1979 July	% Change
Nonresidential Building	$ 4,818.7	$ 4,567.4	+6
Residential Building	6,105.4	6,882.1	-11
Nonbuilding Construction	2,542.4	4,325.8	-41
Total Construction	$13,466.5	$15,775.3	-15

	1980 7 mos.	1979 7 mos.	% Change
Nonresidential Building	$29,504.4	$ 29,297.7	+1
Residential Building	32,765.7	45,505.7	-28
Nonbuilding Construction	17,488.3	29,760.4	-41
Total Construction	$79,758.4	$104,563.8	-24

DODGE INDEX
(1972 = 100, seasonally adjusted)

May, 1980	June, 1980	July, 1980
125	145	148

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